AMERICAN AGRICULTURIST

FOR THE

Farm, Garden, and Household.

"AGRICULTURE IS THE MOST HEALTHFUL, MOST USEFUL, AND MOST NOBLE EMPLOYMENT OF MAN."—WASHINGTON.

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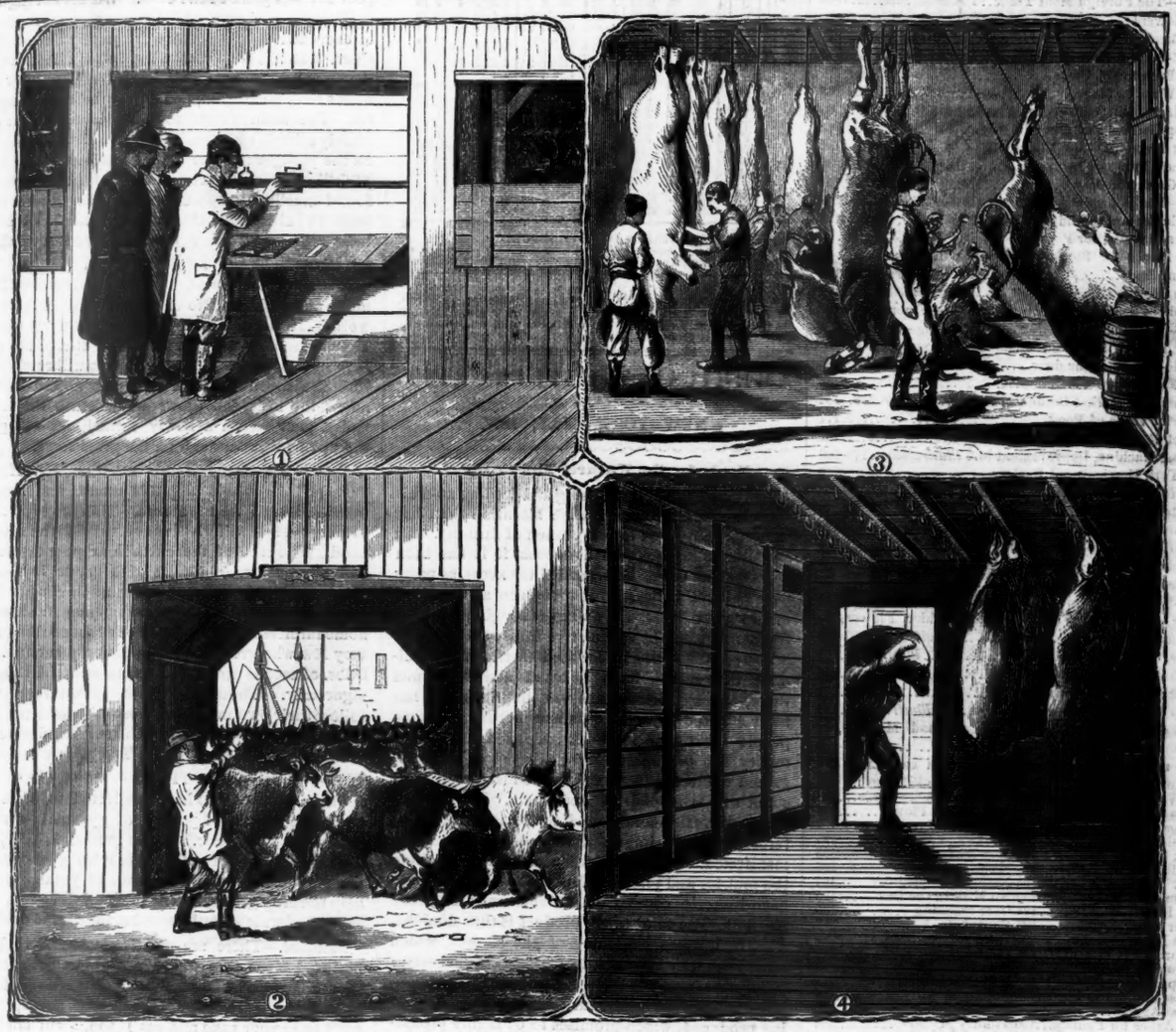

THE FOREIGN MEAT TRADE.—*Drawn and Engraved for the American Agriculturist.*

We have frequently referred to this new business of exporting beef and mutton, which promises to have a most important influence on our system of agriculture. That our readers may have some idea how this business is carried on, we have prepared the accompanying engravings, to illustrate the methods of preparing the meat. In figure 1 is shown the scales where the cattle are weighed, not singly, but in a drove of 40 or 50 at once. This scale has a capacity of 100,000 lbs., which is equal to the weight of 50 head of 2,000 lbs. each. None but the best cattle are taken for this trade, and most of them will go over 1,500 lbs. each. When weighed, the drove is taken to the slaughter pens, as shown in figure 2, and when there are very rapidly reduced to beef. The method of preparing the carcasses is shown at figure 3. A steer is hitched by the hind legs to a rope, and is instantly hoisted out of the pen on to the dressing floor, where it is killed, skinned, and halved. The sides of beef are moved to a cool room, to hang for a few hours, and the quarters are then sown up in canvass bags, after which they are removed to the steamship, and hung up in the refrigerator, (see fig. 4). The refrigerator (fig. 5, page 169) is an air-tight compartment, lined with non-conducting felt; in the center of it is an ice-house, seen in the engraving. A current of air is drawn into the ice-house by means of a fan, operated by a steam engine. The air, cooled by passing through the ice, is forced out at the bottom of the ice-chamber, through ventilators, (seen in figure 4,) and after making the circuit of the room, and cooling the meat, the air-current is drawn out through a door at the upper part of the room, (also seen in figure 4,) and is again forced through the ice, and then again through the meat-room. Whatever moisture is gathered by the air from the meat, is condensed in the pipes which pass through the ice, and escapes along with the waste water from the ice through the drain, shown in the plan, fig. 5. In this way the air is cooled, dried, and purified, and the meat, kept in the most perfect condition, reaches its destination in far better order, than it frequently appears in at the shops in this country. The favor with which this exported meat—mutton as well as beef—is received in England, is a guarantee that the business will increase as long as we can produce the cattle and sheep at the price at which they now sell in the market. It is very certain that the prices of beef would decline rapidly here, if it were not that the surplus is thus exported; as so many as 2,000 head of heavy cattle, taken from our markets in a week, must necessarily have a tendency to lower prices, if they were all to be sold here on an overstocked market. This fact, and that there is a profit now in the business, would show that the trade is likely to continue and increase.

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To Prevent a Cow Sucking Herself.—"V. D. Van N.," Hightstown, N. J., uses the following method of preventing a cow from sucking herself. A surcingle is buckled around the cow's body, and a piece of sack-cloth is hung to it in front of the udder. With this cloth in the way the cow can not suck herself.

Calendar for May.

Day of Month.	Day of Week.	*Boston, N. England, N. York State, Michigan, Wisconsin, Iowa, and Oregon.* Sun rises.	Sun sets.	Moon rises.	*N. Y. City, Ct., Philadelphia, New Jersey, Penn., Ohio, Indiana, and Illinois.* Sun rises.	Sun sets.	Moon rises.	*Washington, Maryland, Virginia, Kentucky, Missouri, and California.* Sun rises.	Sun sets.	Moon rises.
		H. M	H. M	H. M.	H. M	H. M	H. M.	H. M	H. M	H. M.
1	T	4 55	7 0	11 41	4 58	6 56	11 35	5 2	6 52	11 28
2	W	4 53	7 1	morn	4 57	6 57	morn	5 1	6 53	morn
3	T	4 52	7 2	0 24	4 56	6 58	0 17	5 0	6 54	0 11
4	F	4 50	7 3	0 58	4 55	6 59	0 53	4 58	6 55	0 46
5	S	4 49	7 4	1 25	4 54	7 0	1 21	4 57	6 56	1 16
6	S	4 48	7 5	1 47	4 52	7 1	1 44	4 56	6 57	1 41
7	M	4 47	7 6	2 7	4 51	7 2	2 6	4 55	6 58	2 4
8	T	4 46	7 7	2 26	4 50	7 3	2 26	4 54	6 59	2 25
9	W	4 45	7 8	2 45	4 49	7 4	2 45	4 53	7 0	2 46
10	T	4 44	7 9	3 4	4 48	7 5	3 6	4 52	7 1	3 6
11	F	4 43	7 10	3 25	4 47	7 6	3 28	4 51	7 2	3 32
12	S	4 42	7 11	sets	4 45	7 7	sets	4 50	7 3	sets.
13	S	4 41	7 12	8 21	4 44	7 8	8 15	4 49	7 4	8 8
14	M	4 40	7 13	9 33	4 43	7 9	9 25	4 48	7 4	9 18
15	T	4 39	7 14	10 36	4 42	7 10	10 28	4 47	7 5	10 30
16	W	4 38	7 15	11 27	4 41	7 11	11 20	4 46	7 6	11 14
17	T	4 37	7 16	morn	4 40	7 12	morn	4 45	7 7	11 56
18	F	4 36	7 17	0 7	4 39	7 13	0 1	4 44	7 8	morn
19	S	4 36	7 18	0 40	4 38	7 14	0 36	4 43	7 9	0 32
20	S	4 35	7 19	1 6	4 38	7 15	1 3	4 43	7 10	1 0
21	M	4 34	7 20	1 28	4 37	7 16	1 27	4 42	7 11	1 26
22	T	4 33	7 21	1 51	4 36	7 17	1 51	4 41	7 12	1 52
23	W	4 33	7 22	2 13	4 36	7 18	2 15	4 40	7 12	2 17
24	T	4 32	7 23	2 36	4 35	7 19	2 40	4 40	7 13	2 43
25	F	4 31	7 24	3 3	4 34	7 19	3 7	4 39	7 14	3 12
26	S	4 30	7 25	rises	4 34	7 20	rises	4 39	7 15	rises
27	S	4 29	7 26	8 37	4 33	7 20	8 38	4 38	7 16	8 21
28	M	4 29	7 27	9 33	4 32	7 21	9 26	4 38	7 16	9 18
29	T	4 28	7 28	10 18	4 32	7 22	10 11	4 37	7 17	10 4
30	W	4 27	7 29	10 57	4 31	7 23	10 50	4 37	7 18	10 44
31	T	4 26	7 29	11 26	4 31	7 24	11 21	4 36	7 18	11 15

PHASES OF THE MOON.

MOON.	D.	BOSTON. H. M.	N. YORK. H. M.	WASH'N. H. M.	CHA'STON H. M.	CHICAGO. H. M.
3d Quart.	5	6 35 mo.	6 23 mo.	6 41 mo	5 59 mo.	5 29 mo.
New M'n	13	0 45 mo.	0 33 mo.	0 21 mo	0 9 mo.	11 39 12'h
1st Quart	19	8 12 ev.	8 0 ev.	7 48 ev.	7 36 ev.	7 6 ev.
Full M'n	26	11 21 ev.	11 9 ev.	10 57 ev.	10 45 ev.	10 15 ev.

AMERICAN AGRICULTURIST.

NEW YORK, MAY, 1877.

Needs for the Future—The Prospect.

It is very evident that raising and feeding animals for meat, must receive more attention than has hitherto been given to this branch of farming. The speculation in pure bred live stock, if it has been an evil at all, or has been carried to excess, as many persons have believed, has not been an unmixed evil by any means. As we have thought, and have frequently said, the speculative furore excited public interest, and the undoubted merits of the animals themselves, have fastened attention upon them, and by their means vast improvement has been effected in our herds and flocks. If some people have gone in too heavily, and have sunk money out of present sight, they have at least gained wisdom, and by and by the increase of their stock will bring ends to meet again. The vast increase of wealth contributed to the agricultural interest by these improved animals, is now being manifested. As good stock is coming forward from the prairies and plains of Kansas and Colorado, as have hitherto come from Illinois and Kentucky pastures. The value of the product is thus doubled. This is but the beginning of the shower, which must by and by become a torrent. A channel seems to have been opened for the increased supply of largely improved beef, mutton, and pork, now being produced, which promises to be highly profitable. Thus the long hoped for opportunity of changing our system of farming, has probably arrived, or is very near. While we wait and hope, events shape themselves by force of circumstances which we cannot control, and which seem to be mere accidents. Thus the experimental shipment of a few carcasses of beef to England, a year ago, seems to have opened a way for us to change our exhaustive system of farming. Let us avail ourselves of the opportunity; feed as many animals as we can, and raise root and fodder crops for this purpose. At first we must use artificial fertilizers freely, and afterwards as may be needed, to keep crops up to the highest limit. "High farming" must now be the rule if we are to make money. We must get rid of our scrubs: of beeves, that don't make beef; of cows that neither give milk nor yield butter; of sheep that afford neither wool nor mutton; of pigs that make no pork or lard, and of poultry that lay no eggs. We must keep only the best, that is, grades from pure bred males; we must feed high and mature quickly, make rich manure, grow heavy crops, cultivate thoroughly, turn off from one acre as much as we have done heretofore from two, three, or four, and then American Agriculture, which is the freest industry in the world, will be the most profitable.

Hints about Work.

Corn.—This is our great national crop, and ever will be. No known vegetable production can take its place with us. This month the thoughts and labors of the majority of American farmers are directed to this crop. But in by far too many instances an insignificant amount of either thought or labor is given to it. This is shown by the very poor average yield of the crop. We set our figure at 75 bushels per acre. Sometimes we have reached or exceeded this, but more frequently have fallen short. But this is no reason for despair. It is rarely that any person fails that he can not see how he might have succeeded, had he only been more careful. The main points for success are: plant on freshly stirred soil, the planting following closely on the plow; use some active fertilizer in the hill or drill—Peruvian guano or blood fertilizer will be found excellent; use well selected, sound seed, and begin to cultivate, if the ground is hard or baked, before the young corn is seen. For the rest we shall have something to say next month.

Crows and Cut-worms.—We believe the crow is a much abused bird. No one doubts about the cut-worm. If the seed corn is washed in warm water, in which some fresh pine tar is well stirred up, and then dried in plaster, the cut-worms will rarely disturb the sprouts, and if there are no cut-worms about the hills, few crows will disturb the crop. Quick planting on a newly turned sod will give the worms work enough on the grass roots.

Roots.—Sow mangels this month. Mr. Harris "Talks" about this crop this month, and recommends 8 lbs. of seed per acre. This is very heavy seeding; 4 lbs. will give a good stand if the seed is good. The cost of the extra four pounds saved, will buy 50 lbs. of nitrate of soda, or 70 lbs. of guano, and the saving of labor in singling a few thousand plants on an acre, will buy more fertilizers. Some farmers favor heavy, others light seeding; and very few who grow roots thin the crop enough. If 8 lbs. of seed is sown, the plants must be thinned vigorously. Those who have grown roots will follow their own method; those who have not had better try both quantities of seed, and decide by their success which is best. The points essential to success with corn, apply to root crops as well.

Clover.—Those who have neglected to dress the clover fields with 100 pounds of gypsum per acre, should do it at once. If the ground is poor, 100 pounds per acre of either Peruvian guano, or 80 pounds of high grade muriate of potash, would help the crop greatly. The money will be returned in the seed which may be saved at the second cutting.

Meadows.—There are meadows that have been pastured since they were green up to the present time, that will be expected to give a crop of hay in June or July. The homely old adage, "you can't have your cake and eat it too," will apply to this unprofitable practice. It is cheaper to buy hay than to pasture meadows in spring.

Manure.—See that the manure in the yards is not washed by the rains. Pile all of it up neatly, and keep the sides square, and the top flat and dishing. If for want of rain the pile heats and becomes too dry, turn it over. The labor will be well expended. Add in every possible way to its bulk and quality.

Potatoes.—Plant the bulk of the crop as early as possible, to get ahead of the late broods of the Colorado beetle. Procure a supply of *pure* Paris green in readiness for active warfare as soon as the enemy appears. Devoe makes a Paris green which is warranted pure; procure this in the original packages. A few farmers may club together and get a 14-lb. can from headquarters.

Beans.—This crop deserves better treatment than it frequently receives. Those who know its value, give it a fair chance. There is more profit in 25

bushels per acre, at $1.50 or $2 a bushel, than in many crops grown with greatly more trouble. It may be planted at the latter end of the month, or a piece of clover, to be mowed early next month, may be reserved for it. Make the rows 27 inches apart.

Fodder Crops.—A succession of fodder crops should be planted this month, for dairy cows, horses, calves, sheep, and pigs. For all these animals a green crop, to be cut when pasture begins to fail, is of the greatest value; it must be something that will grow quickly, will furnish a heavy cutting or two, and be agreeable and nutritious.

The New Fodder Plant.—It might be well to try the new fodder-plant, Prickly Comfrey, that has been described in the *American Agriculturist*, (see January number, page 19), in a small way. It is no objection to this plant that it is a free grower, and may easily become a weed. So much the better for it. That is a great recommendation. There is no more common weed than clover, yet we do not object to clover because it finds its way everywhere, and keeps its hold. If this plant is useful, the more vigorous it is the better for our purpose. But let it be tested judiciously and sparingly at first.

Brood Mares.—There is no need to keep brood mares idle when nearing their time. Slow farm work and gentle driving, will be useful rather than otherwise. Watch the mare well, and see that her health is kept perfect; give her a roomy, loose stall, where there is no possibility of injury, and she may be worked up to a day or two of foaling. Laxative food, such as bran, ground oats, with some linseed oil-cake meal, or a few chopped rutabagas, will be healthful. If a gentle purgative is needed, give one pint of raw linseed oil, but no salts.

Cows and Calves.—It is well to observe caution in changing cattle from dry feed to full pasture. The safe way is to feed on the usual dry fodder before turning out, and bring up the stock early in the afternoon, and feed again on dry feed with some roots. Another safe precaution is to dose the calves and yearlings with two ounces of Epsom salts for each one, for two days before they are turned out, and then graduate the feed as mentioned. A daily dose of half an ounce of sulphur and as much salt, given every night for a week or two, with the observance of the above precautions, will prevent the fatal "black quarter," or carbuncular erisypelas.

Sheep.—Watch carefully the ewes and lambs that are at all inclined to be loose, lest the fly should strike them. If they become fly-blown, shear the parts and smear copiously with linseed oil and tar. Newly shorn sheep should be kept under cover during cold rains. If this precaution is observed, early shearing is not objectionable. Feed lambs extra food to push them forward. All that is gained in this way now, becomes a double gain by and by.

Pigs.—Sows that are bred this month, will have pigs in September, an excellent time for those who can make small pork for Christmas. Those animals that come to market young, are the most profitable, and a 60 to 80 lbs. 3 months pig is good to have for sale at the holidays.

Machines.—Mowers should be looked after; old ones put in good order at once, and new ones ordered. In buying, look carefully into the claims of the leading kinds. It must not be forgotten that while novelties are worth close attention, an old reputation for undoubted excellence should not be lightly ignored in the search for new things. No farmer with more than five acres of grass, can afford to go without a mower and a horse-rake at least, and perhaps a horse-fork should be included.

Notes on Orchard and Garden Work.

There is no month in which it is more difficult than in May to so shape these Notes as to meet the wants of the greatest number of readers. Whether the season be forward or backwards, or one lives a degree or two north or south, the first of June finds vegetation about equally advanced, but in the present month, while many of our readers have their spring's work well along, others have but fairly commenced. It seems like repetition to so often refer to the Notes of former months, but experience shows it to be necessary, and a great many who ask us about matters relating to the work of the season, would be saved the trouble of writing, did they consult the previous issues of the present volume. This month there is a great deal of moving; those who live in towns and villages change their residences, and many go from cities and towns to try for the first time a life in the country, or at least in the suburbs of cities. Custom has, in many sections, fixed May 1st as moving day, and as a consequence there is a great deal of

Late work in the Garden,

whether it be in the way of fruits, vegetables, or flowers. It is much later than one would choose to begin gardening of any kind, but one who only now comes into possession of land which is to be a garden of some kind, need not be discouraged, for much can be done in all departments even at this late day, and we shall in good part shape the present Notes to meet the needs of those who are obliged to begin their gardening operations late.

Orchard and Nursery.

Planting is usually finished by this time. Trees that have been heeled-in may still be planted. If trees are sent late from nurseries, they may be

Shrivelled or Started.—If the bark is dried and shrivelled, bury the trees, root and top in sandy soil, and at the end of a few days they will come out all right. If they have become heated in the transit, and pushed long white shoots, cut back each branch to a bud that has not so started.

Mulch all late planted trees; it will be well to mulch all planted this spring, before the drouths come.

Grafting may still be done, but more care is required. When vegetation starts, the bark will slip very easily, and a careless operator, in sawing off a limb, may strip the bark and make a bad wound upon the stock. We have grafted apple and pear trees when in full bloom with perfect success. Full directions were given last month.

Thinning the Fruit should begin as soon as it can be ascertained how much is "set." In the Southern States, it is quite time that this was done, and it should be attended to everywhere as early as practicable. There is nothing of more importance to those who grow fruit for profit, than thorough and severe thinning. This is especially the case with peaches and pears, and we are very sure that it will pay with the choicer kinds of apples. In ordinary years, three or four times as much fruit sets as the tree can bring to perfection. Thorough thinning will give about the same bulk of fruit of a quality so much finer than when all is allowed to remain, that a single trial will show its value.

Insects.—The Borers of fruit trees are not all alike, that of the peach belonging to a very different family of insects from that of the apple, but they agree in their destructiveness, and the methods of treating them are the same. Trees at planting should be carefully examined for the insect, and this cut out when found. Examine the trees in the orchard; the saw-dust, or a depression in the bark, will show the presence of the borer; cut it out, or probe it with a wire. *Tent Caterpillars* hatch as soon as there are any leaves. The proper time to destroy them is in the egg. If a web is seen—and they are most conspicuous when the dew is on in the morning—go for it. If you have gloves, well; if not, the caterpillars will not harm you; pull away the nest with the caterpillars, and kill all. *Curculios* not only attack plums, but cherries, peaches, and other fruits. There is but one sure remedy; jar the tree early in the morning, when they are inactive, and catch the insects on a cloth; crush or burn. They begin soon after the fruit is set, and continue for some months. Avoid vaunted cures, such as disagreeable stuff to be hung in the tree; the curculio laughs at such.

Tree Seedlings, whether of fruit or forest trees, need to have the soil stirred between the rows, and all weeds removed; thin if over-crowded.

Seedlings of Forest Trees, even of the most robust kinds, are exceedingly tender when young. The young trees, when they come up in the forest, have an abundance of shade, and in cultivation, more are lost for want of this than from any other cause.

Seed-beds, when small and few, may be shaded by a lattice made of laths, tacked on to strips, putting the laths as far apart as their own width. These screens are to be supported above the beds by stakes. Large beds may have a screen high enough to work under; this may be made of poles, covered with evergreen or other boughs, and supported by crotched posts. In lack of either, sticking leafy twigs quite thickly in the bed among the seedlings, will be better than nothing.

Fruit Garden.

Where circumstances make it necessary to plant late, it may be done, if plants and trees can still be had in a dormant condition. Useful hints on planting will be found in the Notes for January last. Plants set now will be likely to have the summer's heat and drouth to contend with, before they have become fairly established, and unless care is given in mulching them, their growth will be seriously retarded if they do not die altogether.

Mulching consists in covering the soil with a thickness of several inches of some material which will shield it from the direct rays of the sun, and prevent the evaporation of moisture, while it is sufficiently open to allow any rain that may fall to pass through to the soil. It is also of great service in keeping the soil loose and open, as the surface can not bake and form a crust after each rain, while at the same time it prevents the growth of weeds. Litter of any kind may be used that will not bring in the seeds of weeds. Near the coast "salt-hay," or hay made on the brackish marshes is abundant, and a nearly perfect article for the purpose. Elsewhere hay from fresh marshes, straw, cornstalks or other available material may be used. Leaves, including "pine straw," make a good mulch, and spent tan-bark and sawdust are sometimes used. We have seen small stones used as a mulch with good effect. In case mulching cannot be done, some of its good effects may be produced by

Working the surface, keeping the top soil open and light, so that it will conduct the heat less readily than when compact.

Fruit-Picking and marketing will be in order, in some localities, and preparations must be made for the work in others. See article on page 178.

Currants and Gooseberries are both subject to the attacks of a caterpillar, commonly called the "currant worm," which, if neglected, will soon leave nothing but bare stems and shrivelled fruit. See last month's Notes. It is there directed to use 2 oz. of the powdered White Hellebore to the pailful. A friend who has had much experience, says that he finds a tablespoonful sufficient. Two or three applications at intervals of a few days will get rid of them. Gooseberries are almost entirely marketed green; in some localities green currants are in demand, in this case pick so as to thin the crop.

Blackberries and Raspberries.—Such suckers as are not wanted for next year's canes should be treated as weeds. The growing shoots should be tied up when tall enough, and prevented from entangling themselves with the old canes.

Grapes may still be set. The first year grow but a single shoot, and keep it tied up. The caterpillar which folds the leaves of the developing shoot, can only be managed by hand-picking, though it really does less damage than is supposed, as it stops the prolongation of the shoot just where those who follow close training would do it. The most troublesome of the early insects on the vine is the Rose-bug, which appears at blossoming time, making sad havoc. There is no remedy but catching and killing; in early morning they may be shaken off and caught in a pan or cup in which is some water, to prevent flying. Whenever the first signs of mildew appear—grayish spots on the under side of the leaf—use the sulphur-bellows. Each shoot sets three, or two, bunches; market-growers claim that it pays in extra size and quality, to remove all but one.

Pears.—Thin as soon as the young fruit begins to grow; no fruit is more improved by thinning freely.

Strawberries.—After blossoming, the sooner the

mulch is on the better; not only to retain moisture, but it will be needed to keep the fruit clean. Good growers find a profit in giving a dressing of guano as the fruit is growing, and before a rain.

Kitchen and Market Garden.

Those who come into the possession of a garden ground this month need not be discouraged by the lateness of the season, as, save a few things, satisfactory crops may be had of nearly all vegetables. Plants of tomato, cabbage, and some others, can be purchased in most places, or had of a neighbor.

Sowing of all tender things, corns, beans, squashes, and all that family, and others, may be done as soon as cold nights are over, and local experience shows that it is safe to plant corn.

Succession Crops of radishes, lettuce, spinach, etc., should be put in at intervals of a week or ten days.

Varieties.—For a list of the well-tested kinds, see Feb. Notes. For novelties, see catalogues.

Horse Culture.—Where the garden is large enough, it is a great gain to do most of the cultivation with a horse implement. The rows should be long, and wide enough apart for a narrow cultivator; these are made to work at 24 to 30 inches.

Asparagus.—Those who know no better prefer white, or blanched asparagus, which is obtained by covering the beds with several inches of litter. Green is vastly better, as people are finding out. For family use the shoots are none the worse for being so large that they have sprouted or broken a little at the head or top, but for market it must be close and firm. Cutting is best done with an ordinary butcher-knife, cutting about two inches below the surface, and always away from the crown, so as not to injure other shoots. In favorable weather it must be cut every day, and sometimes twice a day. Wash, and stand upright in boxes, if not to be bunched at once. Bunching and bunchers are treated in full in February and May of last year; some half dozen kinds of bunchers are figured.

Beans.—Sow bush sorts in drills 20 in. apart, and drop the beans about 3 in. apart in the drills; cover 2 in. or less. Lima Beans may wait until cold rains are over and the ground warm. Make rich hills, 4 feet apart each way; set a pole 8 or 10 feet high in each. Press the beans into the soil eye down, 6 or 8 to each pole; when well up, thin to four.

Beets.—Thin the early planting as soon as large enough, and keep clean. Sow the main crop, as soon as the weather is settled, in drills 15 in. apart.

Cabbages and Cauliflower.—Plants in hot-beds should be well hardened off and ready to set out. Set the plants 18x30 in. apart, down deep, and press the soil very firmly around the roots. Seed for late crops may be sown. Market gardeners usually make two sowings, 10 or 15 days apart, to be sure to have plants in abundance. Later cauliflower seed is sown about two weeks later than cabbage seed.

Carrots may be sown the same as beets; the main crop is put in after the soil is well warmed, using a great abundance of seed, so that the young plants can break through the ground.

Celery.—A correspondent writes for directions for "a farmer to grow celery; not for a market gardener." We think that the plan that those follow who grow it for a living, is likely to be the best for our farmer friend. He can either buy or raise his plants; if he buys, from the middle of June to the middle of July will be as early as he can get them. To raise the plants, the seed should be in as soon as possible; it should have been sown last month. Prepare a rich seed-bed, and sow the seed in shallow drills 10 inches apart, covering but slightly, and go over the bed with a light roller, or pat the soil down with the back of a spade, to bring it in close contact with the seeds, and insure germination. Some put radish seed in with the celery, in order to see the rows sooner; working the soil must begin early and the plants weeded as soon as weeds can be seen. When the plants are 3 or 4 inches high, the tops are cut off, to make them more stocky. Some of the dwarf solid kinds are preferred to the tall sorts, as they are easier to manage, and give as much edible stalk as the tall kinds.

Corn.—A little of some of the early sorts may be put in at a venture, before it is safe to risk a large planting. We prefer drills made to hills in the garden. Enrich the drills, 3 or 4 feet apart, according to the variety, and drop the seed about 6 inches apart.

Cucumbers.—Seeds may be sown as soon as the season will allow, and plants from the hot-bed set out. If there are no hand-lights, a box, basket, or other shelter, may be turned over the plants at night. Make the hills 4 to 6 feet apart, and put in an abundance of seeds, as the bugs will take their share.

Dandelion.—Those who esteem the wild dandelion will find the improved cultivated sorts enough superior to pay for growing them, for either greens or salad. Sow seeds this month.

Egg Plant.—These must not go out until the weather is quite warm—in the climate of New York the first week in June. Keep the young plants in a growing condition, by maintaining a high temperature and avoiding chills. Look out that no stray potato beetles get among them.

Horseradish is always grown from "sets," or pieces of slender roots 4 to 6 inches long. Market gardeners always plant it as a second crop, between rows of early cabbages or beets. Put in sets half way between the rows and 18 inches apart, making holes with a light crow-bar, 10 inches deep. In the family garden plant it by itself 18 inches each way.

Kohlrabi.—A choice and delicate vegetable, when well grown, and very poor otherwise. Transplant from hot-bed, or sow seeds in rich ground, thinning to 8 or 10 inches. Use when young and tender, the "bulbs" not larger than a tea-cup.

Leek.—Weed the early-sown, or sow at once.

Lettuce.—Transplant from hot-bed or seed-bed to rich soil, 12 to 15 in. each way. Sow for a later crop.

Martynia, the unripe pods of which are esteemed for pickles wherever known, is sown when the soil is warm. Give the plants 3 feet each way.

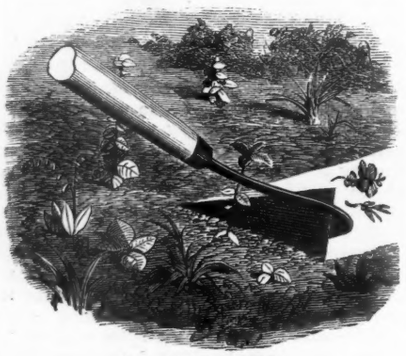
Melons, Musk.—Set out those started on sods, and sow seeds in plenty in hills 6 feet each way.

Melons, Water.—Many of the seeds are imperfect, and when good often slow in coming. Sow liberally, in warm rich soil in hills 8 feet apart.

Squash.—Treat the same as cucumbers. Put the bush sorts 4 feet and late kinds 8 feet each way. Manure abundantly and watch for insects.

Sweet Potatoes.—See article on this culture in Feb. last. Do not plant too early.

Tomatoes.—The plants still in the hot-beds should be hardened off by giving full exposure on mild



LANCE-HEADED HOE.

days. In poor sandy soil, which gives the earliest crops, mark off 3 feet each way and in heavy soil 4 feet, putting at the crossings a shovelful of good manure, or a handful of Peruvian guano, working either well with the soil before setting the plants. In gardens they should always have a trellis, of some kind, to keep the vines in shape and the fruit from the ground. We have given various styles, and any one can make a support with a few poles.

Turnips.—It is too late to sow the flat kinds. If those now growing are troubled by the "flea," dust with lime. If the white worm is at the root, dig all up and destroy, as they will come to no good.

Odds and Ends.—Label every sowing, with kind and date....Weeds can be destroyed easily when young, that in a few days will give trouble—keep ahead of them. A long-toothed steel rake does splendid work....Have slaked lime in readiness for various insects, and where potatoes are grown, Paris green.....Liquid manure, from cow manure, and weak, or guano, a teaspoonful to the gallon, may be used with effect on most plants, except in a dry time....Some of the hand cultivators now in use are greatly superior to the hoe, and will do, in intelligent hands, much more and better work....A lance-headed hoe is one of the most useful implements one can have. The head, see engraving, is of heavy steel plate, 4½ in. long by 2½ wide at the top, fixed to the handle as shown. Any blacksmith can make one, which if kept sharp will do wonderful execution.....Herbs, used for seasoning, such as Sage, Thyme, Sweet Marjoram, etc., should be provided. Sow thinly, in rows a foot apart, and when large enough thin the plants to 6 inches, and transplant the thinnings, if needed. Finally—weed.

Flower Garden and Lawn.

See last months notes on preparatory work. If one begins operations this month, it is well not to attempt too much; make the best of what is found on the place; neatness and good keeping are always pleasing, and will compensate for lack of display.

The Lawn.—In case grass must be sown, or wait until next fall, prepare the soil thoroughly, and sow either Kentucky Blue Glass, Red-Top, or that variety of it called R. I. Bent, with about a quart of white clover to the bushel. On rich soil three, and on poor five bushels to the acre will be needed. Divide into two or three parcels, sowing each in a different direction. Roll well. Cultivators differ as to the utility of sowing oats with the grass seed; at this late season it will be well to sow a quart of oats with each bushel of seed, as the oat plants will then not be too thick, and will afford a much needed shade to the young grass. In making a new lawn, if possible, sod the margins next the roads, flower-beds, etc. If the plot is small and turf can be procured, sod the whole; lay it with care, and pat or pound it down well. Old lawns and those sown early will need mowing, and for this a

Lawn Mower is indispensable, on even a small place. Where there are so many good machines, we cannot advise one in preference to another. The machine should be used every 8 or 10 days, according to the growth; when mowed often the clippings may be left on the grass. Annual seeds will disappear before frequent mowing.

Perennial Weeds must be dug, pulled, or cut. Cutting with a knife or spud just below the surface will kill most of them. The English put a few drops of oil of vitriol in the heart of each plaintain or other large weed. We have not tried it.

Bedding Out.—The plants used for making showy beds are almost wholly tender things from the greenhouse, and should not be set until the weather is settled. Give them rich soil, and if cold, sharp winds come, shelter them.

Cannas, Gladioluses, Tiger Flowers, and similar plants, should now be put out. A clump of cannas alone, set with reference to hight, is very effective. Set in deep rich soil, 3 to 4 feet apart each way.

Annuals from hot-beds and window-boxes may be transplanted, first hardening them by proper exposure. Sow tender ones in the open ground.

Perennials may still be set, as with few exceptions, they bear removal when well started into growth. See catalogues for kinds. Do not omit the garden phloxes for a gorgeous summer show, or chrysanthemums for a late one.

Dahlias may be set, and as soon as they need it must be tied to a stake.

Climbers add much to the beauty of a place; they may be used to decorate the veranda, or to screen fences or other objects it is desired to hide. We once saw a woodpile, that must remain in sight, converted into a "thing of beauty" by the free use of climbers, and looked like a wall of verdure and flowers. For varieties, see article on p. 185.

Evergreens may be set this month as well as any other, if caution be taken to keep the roots from

drying. For a small place there are a number of dwarf sorts that may be used with fine effect. See catalogues. For screens or wind-breaks, Norway spruce and Arbor Vitæ are cheap and certain to grow.

Roses need attention as soon as growth begins. For the Aphis or Green Fly, syringe with tobacco water, or use the "dust" or sweepings of tobacco warehouses, sprinkling it freely while the dew is on. For the Rose-slug, whale oil soap is an old remedy. We are told that White Hellebore, used for currant worms (see "Kitchen Garden") is effective. Where the bushes are few, the slugs may be jarred off early in the morning, and killed. Rose-bugs, which spoil the swelling bud, can only be shaken off. Catch in a dish of water to which some kerosene is added, and kill. Roses may still be planted. They can hardly be overfed with manure, when well established.

Greenhouse and Window Plants.

These are apt to be neglected in the press of outdoor work. Window plants of the hardier kinds, that are not to go into the ground, may be set in the veranda, or other summer location. They will need care as to watering, and those making their growth should be shaped by pinching and pruning.

In the Greenhouse fire-heat will be needed only in cold storms; have the fire laid and ready for lighting when needed. Shading must be applied to the glass, common whitewash answering as well as any preparation. If put on by spattering with the brush, a partial shading will be secured, which may be increased as the sun's heat gets stronger.

Ventilate freely, and remove the hardier plants that are to go out during the summer. Many plants do quite as well if left in the house, and it is less the custom than formerly to strip the houses of plants. Those that are left will require extra care in watering and keeping free from insects.

Camellias and other thick-leaved evergreens should be set out in a shady place, but not under the drip of trees. Where there are many, a roof of lattice, of strips an inch wide and as much apart, may be made to set them under. Set the pots on boards or a layer of coal ashes, to keep out worms. Water and shade the pots from the sun.

Plunging is done with many summer-blooming greenhouse plants, and they serve to decorate the borders. Make a hole large enough for the pot, and put a layer of coal ashes at the bottom.

Commercial Matters—Market Prices.

The following condensed, comprehensive tables, carefully prepared specially for the *American Agriculturist*, from our daily record during the year, show at a glance the transactions for the month ending April 12th, 1877, and for the corresponding month last year:

1. TRANSACTIONS AT THE NEW YORK MARKETS.

Receipts.	Flour.	Wheat.	Corn.	Rye.	Barley.	Oats.
26 d's *this* m'th	265,000	289,000	1,711,000	47,000	304,000	674,000
28 d's *last* m'th	239,000	265,000	1,401,000	69,000	194,500	613,000
Sales.	**Flour.**	**Wheat.**	**Corn.**	**Rye.**	**Barley.**	**Oats.**
26 d's *this* m'th	384,000	1,265,000	2,307,000	53,000	257,000	896,000
28 d's *last* m'th	227,000	634,000	1,931,000	98,000	246,000	771,000

2. *Comparison with same period at this time last year.*

Receipts.	Flour.	Wheat.	Corn.	Rye.	Barley.	Oats.
26 days 1877	265,000	289,000	1,711,000	47,000	304,000	674,000
27 days 1876	281,000	1,062,000	437,000	31,000	198,000	783,000
Sales.	**Flour.**	**Wheat.**	**Corn.**	**Rye.**	**Barley.**	**Oats.**
26 days 1877	334,000	1,265,000	2,307,000	53,000	257,000	896,000
27 days 1876	329,000	2,014,000	891,000	68,000	264,000	971,0 0

3. *Stock of grain in store at New York.*

	Wheat. bush.	Corn. bush.	Rye. bush.	Barley. bush.	Oats. bush.	Malt. bush.
Apr. 10, 1877	1,782,931	1,035,654	249,423	320,331	606,639	311,032
Mar. 5, 1877	2,730,641	1,711,095	288,895	513,826	822,625	335,208
Feb. 7, 1877	3,083,819	2,902,261	374,142	671,114	956,114	388,605
Jan. 8, 1877	3,698,010	3,077,504	341,750	905,615	1,088,104	425,406
Dec. 11, 1876	3,110,283	3,385,354	218 841	873,310	1,182,322	512,041
Aug. 7, 1876	2,891,299	904,557	94,960	53,914	1,252,986	434,208
Apr. 10, 1876	3,393,074	232,140	68,429	200,381	706,282	496,942
Jan. 10, 1876	5,902,293	663,982	100,741	325,191	1,080,300	307,488

4. *Exports from New York, Jan. 1, to April 12.*

	Flour. bbls.	Wheat. bush.	Corn. bush.	Rye. bush.	Barley. bush.	Oats. bush.	Peas. bush
1877	357,867	2,093,192	4,275,663	378,689	121,229	48,491	115,211
1876	569,514	4,994,177	3,668,928	43,320	—	63,894	258,251

Gold has been up to 106, and down to 104⅛, closing April 12, at 105⅞, as against 104⅝ on March 12; 106 on Jan. 12; 107¼ on Dec. 12, 1876, and 113 on the 12th of April, 1876... The encouraging feature of business, this month, in the Produce line, is the notable advance in Breadstuffs, under the influence of the light offerings here and in the interior, the much more favorable foreign market advices, the decidedly active inquiry for supplies (largely for export), and toward the close the reports and rumors as to the probabilities of a great war in Europe, which quickened demand on the later days of the month under review, and led to a sharp rise in values, especially of Spring Wheat, mixed Western Corn (for prompt and forward delivery), and prime Rye, afloat. The dealings in Corn on Wednesday, April 11th, reached the very large aggregate of 650,000 bushels, about half of which amount was for April and May deliveries. Oats have found a very ready sale to the local jobbers, toward the close, at advancing prices. The whole position of the Breadstuff trade is deemed much more satisfactory, and the outlook quite encouraging. Of the purchases near the close were about 2,000 bbls. State Superfine Rye Flour, good to choice, at $4.90@$5.10, for shipment to Antwerp, the first important export movement reported in this article for a long time past.... Provisions have been fairly active, but unsettled and lower as to values, closing, however, more steadily.... Cotton has receded materially in price, under free offerings, and a less confident demand.... Wool has been less sought after, and quoted weaker, and at the close generally heavy.... Tobacco, Hops, Hay, and Seeds, have been in moderate request at the ruling figures.... Ocean Grain Freights have been depressed and irregular, but closing somewhat stronger.... Grain rates by steam to Liverpool closed on the 12th of April at 5*d.*, having rallied from 4*d.*; to Glasgow at 6*d.*; to London at 6¼*d.*; to Liverpool, by sail at 5*d.*; London, by sail, 5⅛@6*d.* per bushel. Provisions by steam to Liverpool, 17*s.* 6*d.*@22*s.* 6*d.* per ton; Cotton by sail and steam at ¼*d.* ₱ lb. Grain, by sail, for Cork and orders, at 4*s.*3*d.*@4*s.*9*d.* per quarter.

CURRENT WHOLESALE PRICES.

	Mar. 12.	Apr. 12.
PRICE OF GOLD	104 5-8	105 7-8
FLOUR—Super to Extra State	$5 35 @ 6 25	$6 25 @ 7 75
Super to Extra Southern	5 45 @ 9 00	6 40 @ 9 75
Extra Western	5 55 @10 75	6 85 @11 00
Extra Genesee	6 25 @ 7 35	7 75 @ 8 75
Superfine Western	5 35 @ 5 75	6 25 @ 6 90
RYE FLOUR	2 75 @ 5 00	3 00 @ 5 25
CORN-MEAL	2 65 @ 3 25	2 65 @ 3 50
WHEAT—All kinds of White	1 45 @ 1 61	1 60 @ 1 80
All kinds of Red and Amber	1 05 @ 1 60	1 25 @ 1 80
CORN—Yellow	56 @ 58	57 @ 60
Mixed	54 @ 58½	57 @ 60
White	57 @ 60	57 @ 60
OATS—Western	37½@ 48	42 @ 57
State	48 @ 56	52 @ 60
RYE	81 @ 91	85 @ 97
BARLEY	57½@ 1 05	57¾@ 1 02½
BARLEY MALT	65 @ 1 25	65 @ 1 25
HAY—Bale, ₱ 100 lbs	65 @ 1 00	65 @ 1 00
STRAW, ₱ 100 lbs	50 @ 80	50 @ 75
COTTON—Middlings, ₱ lb	12¾@ 12¾	11⅝@ 11⅝
HOPS—Crop of 1876, ₱ lb	4 @ 17	8 @ 17
" Old, ₱ lb	4 @ 12	4 @ 10
FEATHERS—Live Geese, ₱ lb	45 @ 55	42½@ 45
SEED—Clover, ₱ lb	14½@ 16	14 @ 15½
Timothy, ₱ bushel	1 90 @ 2 05	1 85 @ 2 00
Flax, ₱ bushel	1 70 @ 1 75	1 60 @ 1 75
SUGAR—Refi'g & Grocery ₱ lb	8¼@ 10¼	7¾@ 10¾
MOLASSES, Cuba, ₱ gal. 50 test	39 @ 40	32 @ 42
New Orleans, new crop, ₱ gal	40 @ 56	88 @ 55
COFFEE—Rio (Gold)	17 @ 20¾	16 @ 20
TOBACCO, Kentucky, &c., ₱ lb	5 @ 8	5 @ 18
Seed Leaf, ₱ lb	4½@ 50	4¾@ 50
WOOL—Domestic Fleece, ₱ lb	30 @ 52½	27 @ 50
Domestic, pulled, ₱ lb	20 @ 45	18 @ 42
California, spring clip	15 @ 30	12 @ 28
California fall clip	12 @ 23	12 @ 23
TALLOW, ₱ lb	7¾@ 8¾	7¾@ 8¾
OIL-CAKE—₱ ton	— @34 00	33 00 @ —
PORK—Mess, ₱ barrel	14 75 @ —	15 00 @15 10
Prime, ₱ barrel	12 00 @ —	11 50 @ —
BEEF—Plain mess	10 50 @12 00	10 00 @11 50
LARD, in trcs. & bbls, ₱ 100 lb	9 50 @10 12½	9 00 @10 25
BUTTER—State, ₱ lb	18 @ 32	16 @ 32
Western, poor to fancy, ₱ lb	12 @ 32	10 @ 30
CHEESE	6½@ 16¾	6¾@ 15¾
BEANS—₱ bushel	1 50 @ 3 25	1 50 @ 3 00
PEAS—Canada, free, ₱ bush	1 07 @ 1 10	— @ 1 10
EGGS—Fresh, ₱ dozen	15½@ 17¼	17 @ 18¾
POULTRY—Fowls & Chickens	10 @ 14	10 @ 15
Turkeys—₱ lb	5 @ 14	10 @ 18
Geese, ₱ pair	1 25 @ 2 00	1 25 @ 2 50
Geese, ₱ lb	7 @ 10	8 @ 12
Ducks, ₱ pair	55 @ 1 25	70 @ 1 25
" ₱ lb	— @ —	18 @ 18
Roosters, ₱ lb	6 @ 8	4 @ 8
Capons, ₱ lb	— @ —	18 @ 22
DUCKS, Wild, ₱ pair	80 @ 2 00	15 @ 75
PIGEONS, wild, ₱ dozen	75 @ 1 65	1 00 @ 1 75
SQUABS, per dozen	— @ —	3 50 @ 3 75
PLOVER, ₱ doz	— @ —	1 00 @ 1 25
SNIPE, per doz	— @ —	35 @ 1 25
TURNIPS ₱ bbl	50 @ 75	75 @ 1 00
CABBAGES—₱ 100	— @ —	5 00 @12 00
ONIONS—₱ bbl	2 75 @ 4 50	3 50 @ 5 00
LETTUCE, ₱ bbl	— @ —	1 75 @ 3 25
POTATOES—₱ bbl	2 75 @ 3 6½	2 75 @ 3 87½
new, Bermuda	6 00 @ 7 00	8 00 @ 9 00
SWEET POTATOES—₱ bbl	2 00 @ 4 50	3 50 @ 5 00
SPINACH, ₱ bbl	2 00 @ 2 25	2 00 @ 3 00
TOMATOES, new Bermuda, bx	1 25 @ 1 75	1 00 @ 1 25
BEETS, ₱ crate	— @ —	2 00 @ 3 00
RADISHES, ₱ 100 bunches	— @ —	1 50 @ 3 00
ASPARAGUS, ₱ doz. bunches	— @ —	62½@ 1 00
BROOM-CORN	3 @ 7	3½@ 8
GREEN PEAS, ₱ crate	— @ —	2 00 @ 4 00
CRANBERRIES—₱ crate	— @ —	50 @ 2 50
APPLES—₱ barrel	1 25 @ 2 00	1 50 @ 3 75
SQUASH, ₱ bbl	1 25 @ 1 75	1 75 @ 3 00
PEANUTS, domestic, ₱ bush	— @ —	85 @ 1 25

New York Live-Stock Markets.

RECEIPTS.

WEEK ENDING	Beeves.	Cows.	Calves.	Sheep.	Swine.
Mar. 19	10,627	42	1,284	20,081	21,952
Mar. 26	11,125	86	1,199	24,357	19,526
Apr. 2	9,069	77	1,622	17,399	18,703
Apr. 9	9,257	61	2,204	23,063	22,663
Total for 4 Weeks	40,078	256	6,309	84,900	82,844
do. *for prev. 4 Weeks*	31,287	449	3,338	72,741	70,201
	Beeves.	**Cows.**	**Calves.**	**Sheep.**	**Swine.**
Average per Week	10,019	66	1,577	21,225	20,711
do. do. *last Month*	8,582	112	834	18,185	17,550
do. do. *prev's Month*	9,837	106	727	22,103	20,547

The prices for the past four weeks were as follows:

WEEK ENDING	Range.	Large Sales.	Aver.
Mar. 19	9 @12¾c.	10 @11¼c.	10¾c.
Mar. 26	8¾@12¾c.	9¾@11¼c.	10¾c.
Apr. 2	8¾@12¾c.	9¾@11 c.	10¾c.
Apr. 9	9¾@12¼c.	9¾@11¼c.	10¾c.

Beeves.—With over 10,000 of the best cattle taken out of the market for export to England, we have still had but a dull and drooping market. What would have happened had these 10,000 head been added to the 30,000 sold, it is impossible to say, but no one doubts that the bottom would have dropped entirely out of the market. The foreign export now saves the live stock trade from utter disaster. Nothing is more certain than that. The whole month's business has been far from lively, and the advance of ¼c. ₱ lb the first week, was more than lost immediately, and was not recovered at the close, when fair native steers, 56 lb to the cwt., sold for 10@ 10¾c. ₱ lb; good cattle brought 10¾@11¼c., and really prime beasts, of which there were plenty, 11@11¼c. No extra cattle sold for over 12¼c. ₱ lb, estimated 58 lb to the cwt.... **Cows.**—The market has ruled dull all through the month. Strange to say, although the Board of Health has, by numerous successful prosecutions, compelled milkmen to sell milk without mixture of water, yet the demand for cows has fallen off. A large supply of country milk keeps the trade in city milk at low water. By and by it may turn out that the city "Orange Co." dairies based largely on swill, may need no more cows, "a consummation devoutly to be wished." Few cows have brought as much as $60, the range has been $40 to $50 for common, to $55@$65 for good to extra.... **Calves.**—Weakness has afflicted the veal market. The supply has been too great for the demand, and 7c. is the limit offered by butchers for the best. Poor little veals from a week old upwards, and of the "bob" character, have sold in large numbers at $2@$4 each. Fair veals have brought 6@6¾c. ₱ lb, and the best picked lots occasionly have gone as high as 7¼c. ₱ lb live weight.... **Sheep and Lambs.**—Trade has been slow and easy for all except the best fat sheep, which have been picked up freely for shipment, 2,000 head thus went in the last week. Most of the business was done at 5¾@6¼c. ₱ lb for ordinary, 6¾@7c. for good and the best, a lot of 131 lb fat sheep, very fine, from Steuben Co., N. Y., brought 8¼c. ₱ lb live weight.... **Swine.**—There is nothing worthy of note in hogs, except that live Ohio hogs, 184 lbs., sold the last week for 5¾c. ₱ lb, and city dressed at 7@7¾c.—small pigs brought 7¾c.

Prices of Feed.

Bran, per ton	$18.00@$20.00
Middlings, per ton	19.00@ 21.00
Ground Feed, per ton	15.00@ 21.00
Linseed-oil-cake, western, per ton	44.00@ 47.00
Cotton-seed-cake, per ton	25.50@ 40.00
Chandler's Scraps, per lb	3@ 4

Prices of Fertilizers.

No. 1. Peruv. Guano 10 p. ct. ammonia, standard, ₱ ton	$56.50
do. do. guaranteed, ₱ ton, cargo C	56.00
do do. rectified, per ton, 10 p. c.	66.50
Mapes' Complete Manure (Ville formula) p. 1,000 lbs	26.14
" Potato do do do	25.97
" Turnip do do do	19.36
" Fine Bone, strictly pure ...per ton	40.00
" Dissolved Bone, 15 per cent do	40.00
Quinnipiac Fertilizer Co's. Phosphate, per ton	40.00
" " Dry g'd Fish Guano, ton 9 p. c. am's	42.00
" " Pine Island Guano, per ton	42.00
Stockbridge Corn Manure, (Boston) per acre	22.00
" Potato do do do	12.00
" Tobacco do do do	60.00
Bowker's Hill and Drill Fertilizer, per ton	45.00
German Potash Salts, (25@35 per cent), per ton	20.00
Gypsum, Nova Scotia, ground, per ton	8.00
Nitrate of Potash (95 per cent.), per lb	9¾c.
Sulphate of Potash (50 per cent) per lb	4 c.
Chloride of Potass, (muriate of potash, 80p.c.), lb	2¾c.@ 3 c.
Nitrate of Soda, per lb	4¼c.@ 4¾c.
Sulphate of Ammonia (25 per cent.), per lb	5 c.@ 5½c.
Dried Blood or Dried Meat per unit of ammonia	$3.00@ $ 4.00

Artificial Fertilizers—What Farmers are Doing.

Probably never, since artificial fertilizers were known, have they been used so intelligently as they are being, and will be applied this year, and it is safe to say that more will be added to the general knowledge in relation to these fertilizers than ever before. The *American Agriculturist* can fairly take to itself a good share of the credit in producing this state of affairs, as nowhere else has the matter of fertilizers been more thoroughly discussed, and the principles upon which they should be used more clearly explained, than in these columns. Especially have the articles of Prof. Atwater, seconded by those of the Editors, pointed out to farmers the only way in which they can learn the deficiencies of their soils—by experiment; they have given the constituents of plant food most likely to be lacking, and indicated the most economical and available sources whence these can be obtained. It has been shown that it is a waste of money to apply a complete manure, when potash only is needed, and that it is equally useless to add ammonia when the one thing needed for a paying crop is phosphoric acid. Farmers, and cultivators generally, have made an important step in learning that there is no more one universal fertilizer, than there is a universal remedy

for disease; and a still more important step in determining to ascertain for themselves, by careful experiment, what they can most profitably employ. There is another thing relating to fertilizers in which the *American Agriculturist* has done its share, viz: the pointing out the commercial forms in which the essentials—nitrogen or ammonia, potash and phosphoric acid—may be bought, and their prices. We must admit that our efforts in encouraging experiments with fertilizers would have borne little in the way of practical results, had they not been seconded by the dealers in fertilizers. It is greatly to the credit of the respectable houses in this business, that they offer to sell by actual analysis, and guarantee that the article they offer shall contain exactly the elements, and in the quantities represented. It is possible for the farmer now to do, what a short time ago was so difficult that it was well-nigh impossible, *i. e.*, order just such amounts of plant food he may desire, in the cheapest or most available form. If he wishes to test the value of any formula upon his land, it can be put up as he directs. If he wishes to have at hand in stock, phosphoric acid, potash, and nitrogen, that he may test them singly or in various combinations, he can buy the articles containing them, of high grade or low, as he may prefer, knowing that he will get just what he pays for. A reference to our advertising columns will show that dealers, as a general thing, offer their fertilizers as warranted to contain a given percentage of the valuable constituents, and a perusal of the circulars sent out by the makers of, and dealers in these articles, shows that they assume that the purchaser knows what he wants, and will buy intelligently. The day for secrecy in fertilizers is over.

The American Agriculturist, May 1, 1877, is another choice number, filled with interesting, and practically useful information, illustrated with some sixty original engravings, among which are pictures of the mode of sending meat to England. Nine columns point out *what* to do in May, and *how* to do it. Eleven Basket columns contain 75 short topics on a variety of subjects. The Humbug columns are sharp after swindlers upon farmers and others. "Ogden Farm Papers," "Among the Farmers," and "Talks on Farm Crops," are full of practical information, the last on the culture of Corn, Cabbage, and Beet crops. A $1,000 Country Home, gives engraved plans, and full specifications of materials required, and cost of each. Prof. Atwater gives important fertilizer experiments. Short-horn and Devon cattle are illustrated and described. Several pages of "Hints and Helps," with 14 illustrations, show a variety of useful farm and other contrivances. New Flowers are described with illustrations. Prof. Gray treats of Fertilizing Plants; Prof. Sargent of Forest Trees; Peter Henderson and others on the Blue Glass mania; Changing the Bearing Year of Orchards is described; "Faith Rochester" gives her valuable Talks with Housekeepers; Home-made Refrigerators are described and illustrated; The "Doctor," "Aunt Sue," and others, amuse and instruct the Little Folks. This number is worth its weight in silver, if not in gold.—Terms, $1.60 a year, post-paid; 15 cents a copy. ORANGE JUDD COMPANY, New York, Publishers.

Every German Cultivator and Laborer on the Farm, or in the Garden, OUGHT to have the German edition of the *American Agriculturist*. It contains not only the Engravings, and all the essential reading matter of the American edition, but an additional *Special German Department*, edited by the Hon. Frederick Münch, of Missouri, a skillful and successful cultivator and excellent writer. No other German Agricultural or Horticultural Journal in America has been so long issued; no other one contains so much useful information, or a tithe of its engravings. The Germans are a reading, thinking people, and know how to make good use of what they read. Many Americans supply it to their German laborers and gardeners, and all would find it pay to do so.—Nothing else can compete with it in cheapness of price for the same amount of material, engravings, etc., because the expense of collecting and making these is largely borne by the American edition, and no separate office or machinery is required beyond a couple of German editors and the printers. Its terms are the same as the American edition, singly and in clubs; and clubs can be composed of subscribers for either edition in whole, or in part.—☞ Please call the attention of your German neighbors to this paper. It will do much to help new comers to a knowledge of the system and modes of culture used in this country.

containing a great variety of Items, including many good Hints and Suggestions which we throw into smaller type and condensed form, for want of room elsewhere.

Publishers' Notices, Terms, etc.—The Annual Subscription Rates of the *American Agriculturist*, postage prepaid by the Publishers, are: One Copy, $1.60 a year; *Two* Copies, $3; *Three* Copies, $4.20 ($1.40 each); *Four* Copies, $5.20 ($1.30 each); *Five* to *Nine* Copies, $1.25 each; *Ten* to *Nineteen* Copies, $1.20 each; *Twenty* Copies and upwards, $1.10 each; Single Numbers, 15 cents, post-paid.—The above terms are for the United States and Territories, and British America. To the above add 14 cents extra per year for papers delivered by mail in N. Y. City, and for copies sent outside of the United States and British America, *except* to Africa, Brazil, British Honduras, the East Indies, and Mexico. For the last named five countries the extra charge is 38 cents per year, to cover extra postage; Single Numbers, 17 cents, post-paid.....**Remittances,** payable to Order of Orange Judd Company, may be sent in form of Checks or Drafts on N. Y. City Banks or Bankers or P. O. Money Orders; or in Registered Letters, such letters to have the money enclosed in the presence of the Postmaster, and his receipt taken for it, and the postage and registering to be put on in stamps. Money remitted in any one of the above three methods is safe against loss..**Bound Volumes** from Vol. 16 to 35 inclusive, supplied at $2 each, or $2.50 if to be sent by mail. Sets of numbers sent to the office will be bound in our regular style for 75 cents (50 cents extra if to be returned by mail). Missing numbers for such volumes supplied at 12 cents each.—**Any Numbers** of the paper issued for 20 years past, sent post paid for 15 cents each.... **Clubs** of Subscribers can be increased at any time at the club rates, if new members begin at same date as original club.

TRY THE NEW POTATO.—In our last number we described the most promising new variety of Potato this year, and offered some seed. We have sent parcels to several hundred different localities during the past month, from which we hope to have excellent reports in autumn. Those who plant half a pound or more, with the care in cultivating, etc., as described on page 127, will be likely to have seed for a large planting next year, and thus be ahead of all their neighbors, as there was not 50 bushels for the whole country this year. If this potato proves as valuable as it is hoped it will, the product of a single pound will be worth $50 to $100 for planting next year. It is certainly worthy of a careful trial. It can be planted during the first part of May, and even up to the 20th, or later in Northern localities. At the time of writing this, the prospect is that we shall have some 400 to 500 parcels to distribute, after May 1. We therefore continue the offer of last month, viz: **To any present Subscriber sending one new subscriber to the "American Agriculturist" for 1877, at the regular price of $1.60 a year, the Publishers will send, postpaid, two of the SUPERIOR POTATOES or one half pound; and to any one forwarding TWO subscribers as above, they will send 3 parcels or 1 1-2 lbs. of the Potato; and in the same proportion for more than 2 subscribers.** (Names for this premium count in no other list, and it will only be given to those sending names specially for it.)

A Pocket Microscope ought to be in every house as a source of rational amusement and instruction; to examine plants, insects, and multitudes of objects too small for the unaided eye. *Abbott's* Pocket Microscope, costing $1.50, and serving a good purpose, will be presented, and sent securely packed, post-paid, to any one forwarding four subscribers to the *American Agriculturist*, at $1.60 a year.—The "*Excelsior*," costing $2.75, a more complete instrument, will be presented to any one sending seven subscribers. It will be delivered free. Any boy, or man, will be abundantly rewarded by one of these instruments for the trouble required to find and forward four or seven subscribers.

Look into the "BAZAAR."—We know no better designation than this, for the fine display, by good parties, of the great variety of seeds, plants, implements, machinery, and many other things, that are set forth on the second cover and some other pages of this Journal. One can there learn, without going from his fire-side, concerning a multitude of articles and enterprises. Those in charge of that department are instructed to "admit no quacks or quackery, and only those who have the ability and the intention to do what they promise to do in their advertisements." Our readers will find it profitable to take a stroll all through this department, not only to find the best places to get what they want, but also to gather useful business hints by seeing what others are doing, what they say, and how they say it. It is always well when corresponding with these men in ordering, inquiring, sending for circulars, etc., to inform them that you made their acquaintance through the pages of the *American Agriculturist*; it will do no harm, and may be of double advantage.

Very Handy to Have, is the "*Pocket Tool Holder*," for a hundred little jobs. A hollow handle contains 20 small cast-steel tools—awls, chisels, punches, screw driver, etc. Any one of these is quickly adjusted in the end of the handle, ready for use. One will be sent free, post-paid, to any person remitting three subscribers for the *American Agriculturist*, at $1.60 a year.

To Puzzlers Young and Old.—Last month, page 146, Aunt Sue gave a "Prize Enigma." In making up the page, an "Illustrated Rebus" was placed in the same column with her offer, because there was no more convenient place for it. Many who are working for her Enigma Prize, think that this Rebus is included with it. This Rebus has nothing to do with Aunt Sue's Enigma. Read her article just as if this was not there.

More Potato Premiums.—Messrs. Hawkins & Cornish, Seedsmen of Goshen, Orange Co., N. Y., last year offered premiums for the greatest yield from one pound of seed of their Mahopac Seedling Potato. The largest yield was returned by H. C. Pearson, Pitcairn, St. Lawrence Co., N. Y., who obtained 1,994 lbs., or 33¼ bushels, from one pound, and received the highest prize, $50. The amounts reported by four others were: 1,877, 1,774, 1,528, and 1,278 lbs. respectively. The catalogue of Messrs. H. & C. gives the modes of culture. The Mahopac was raised from the seed of the Garnet Chili, crossed with the Prince Albert; is medium late, light rose color, and great excellence, as well as productiveness is claimed for it. They have other specialties in the way of potatoes, not offered elsewhere.

Any Boy Wanting a Good Pocket Knife, can secure one of first-rate quality, sent to him by mail, free of all cost, with 3 good blades and buck-horn handle, by stirring round among his friends with a copy of the *American Agriculturist*, and geting four of them to subscribe for a year. The exercising of his business talents in this way, will do him good; he will get the good knife; and the four subscribers will be benefitted by having the paper. (Six subscribers will secure an extra four-bladed knife, with pearl handle; or a lady's beautiful pocket-knife, with four blades and a shell handle). N.B.—These knives are not poor, soft, or brittle things, made for show or "to sell," but first quality, A, No. 1 articles made to use.

"The East India Tree Pea."—This is being generally advertised, and numerous inquiries are made concerning it. As nearly as we can recollect, this is advertised in almost exactly the same terms that were used a few years ago in describing the "Japan Pea." If, as we suppose, this "East India Tree Pea" is the same as the "Japan Pea," a description of it will be found in the *American Agriculturist* for Feb., 1874, with an engraving of the leaves and pods. It may be useful as a fodder plant in the warmer States, but for human food, nearly worthless, green or ripe. It is not a true pea.

There is no Questioning the Fact that any Farmer who has a small library, even if it be but half a dozen good books, treating about his own business, will feel himself more of a man, will have more dignity of character, will be more respected by others, and respect himself and his calling more; and the same effect will be produced upon his entire family. Then again, he will think more and better; and there are few books so poor that they will not give him some new thoughts, hints, and suggestions that will lead to more profitable practice, so that in the end he will receive

back five, ten, twenty-fold, the cost of the books. We wish every farmer could see, as we see it, of how much value it would be to invest $5, $10, or better, $20 in securing a small library, no matter how great a sacrifice in some other direction, or how great the effort it may cost. The mail now brings books to every man's door. We *know* that every man who will follow our advice, and get such a library now, will in less than three years warmly thank us for urging him to do so. There are many good books advertised now. To any one desiring it, we will be happy to offer advice as to a selection, if he will state his circumstances, what he has read, etc.

War—Push in One Acre More.—At this writing (April 16) every indication points to a great war in Europe, to commence between Russia and Turkey, but likely to extend to other nations. This will involve the great granery of the lower Danube, and lead to a much larger demand upon this country for many farm products. While we deplore war, it is well for our farmers to push their productions to the highest point, not only by careful cultivation to increase the yield, but by getting in every additional acre possible this spring.

The Grasshopper Commission.—Congress made an appropriation, and commissioners have been appointed for a thorough investigation of the Locusts, or grasshoppers, and the means of preventing their devastations. The gentlemen appointed are Prof. C. V. Riley, of Mo.; Prof. Cyrus Thomas, of Ills.; and Doct. A. S. Packard, Jr., of Mass. These gentlemen have already taken the field in different parts of the far West, and will no doubt get at the "bottom facts" concerning this scourge. The question naturally suggests itself, What is our Department of Agriculture for? Here is a work that belongs eminently to that Department, put in the hands of others. Is not the present Commissioner competent to direct such an undertaking, or is he so busy in sending out seed that he has not heard of the grasshoppers?

Special—The "Book Acre."—Knowing, as we do, the great advantage of good books to every farmer, we offer the following suggestion: Select one acre in addition to what is now planned for, label it the "BOOK ACRE;" cultivate it at odd hours, and resolve to invest the proceeds in good books on farming. It will be the best paying acre, on many farms, that was ever grown. *Try it this year.*

A Thing Worth Doing.—If any farmer will get five of his neighbors to join him in subscribing for the *American Agriculturist* for the present year, at the regular rates of $1.60 each, (or six others if he is himself a subscriber now), the Publishers will send as a present a copy of Allen's "New American Farm Book," (price $2.50), post-paid. This valuable book is full of useful information, and it can be passed around and consulted and read by all of the six or seven persons, and make a good beginning for a farmers' Circulating Library. The cost to each, at $1.60 a year, which pays for postage also, will be only 3 cents a week. Surely a copy of the *American Agriculturist* in each household a whole year, and the use of this large instructive book, will richly repay so small an investment. It will pay.

OR.—If impossible to get the six subscribers named above, let four subscriptions be made up, and select one of the $1.50 books from the list on third cover page of this number, say Henderson's "Gardening for Profit," or "Harris on the Pig," or Stewart's "Shepherds' Manual," or Thomas' "Farm Implements," or Waring's "Draining for Profit." Any one of these books circulated and read, will be of great usefulness.

Wide-a-Wake in Australia, New Zealand, Bermuda, etc.—The following pleasant bit of commendation comes in a letter from a gentleman well known in the scientific world, who is passing the winter and spring in the Island of Bermuda: "I was riding, the other day, with a well known English naturalist, along a quiet country road. We were passing one of the pretty little cottages peculiar to Bermuda, but which showed more than ordinary taste in its surroundings. The snow-white limestone walls were covered with vines, a graceful hedge of pigeon-bush concealed the out-houses from sight, while between the cottage and the road was a level well kept lawn with neat borders, dotted with choice shrubs: the gorgeous scarlet-bracted Poinsettia, the elegant "Flambeau," (*Poinciana pulcherrima*), cycads, shell-plants, and such a profusion of roses as only Bermuda or South Carolina can show. My friend exclaimed: 'What a neat little place; those people must surely take in the *American Agriculturist*.'—I asked him why he thought so, and he replied, 'Why anywhere in Nova Scotia or New Brunswick, where you see a house the clean and neat appearance of which shows that the owners take pride in having a pretty place, you may be sure that they take in the *American Agriculturist*. I have remarked it very often in driving through the country. It is a most wonderful paper. I never read a number without getting several useful ideas, and it has put us up to no end of new contrivances. I send it occasionally to friends in England, who are greatly pleased with it; they say there is nothing like it in Europe.'—So you see the *American Agriculturist* is appreciated abroad as well as at home."... This Journal is *the* Agricultural paper of *Australia*.—It would be almost a novelty for a mail to arrive from that country that did not bring us a considerable batch of subscribers.—*New Zealand* seems determined not to be behind her neighbors in securing the benefit of Yankee ideas and improvements. Yesterday came a remittance for 92 subscribers, which follow hard after previous orders for 66 copies, 21, 30, 34, etc.

Potash as a Fertilizer.—The last of the series of useful circulars sent out by the "Mapes Formula and Peruvian Guano Co." is devoted to a discussion of Potash in its relation to agriculture. This circular is none the less valuable from the fact that it is largely made up of extracts from Prof. Atwater's articles, which appeared in the *American Agriculturist*, due credit, of course, being given. The matter relating to potash, which the reader would have to hunt up through many months, is here brought together in a compact, useful form, from which one can learn more about the uses of potash and its cheapest sources than he is likely to find elsewhere.

The Uses of Rhubarb.—"T." says: Having an abundance of rhubarb as one will have who has any plants at all, we in former years noticed that after a few pies in early spring, the novelty having worn off, the rhubarb was rarely used. An inquiry at "headquarters" revealed the fact that rhubarb was so juicy that the pies would "stew over" into the oven, that the juice prevented the "bottom crust" from baking properly; "no one cared for the pies after the first ones," "so much sugar," and other things, which we do not now recollect, but to all of which we made answer—"Brown Betty." The suggestion was followed, and thereafter a rhubarb Brown Betty became one of the institutions of the family. To "B. B." you need breadcrumbs, rolled, but not fine, the size of split peas, more or less; rhubarb, cut small; sugar, cinnamon, or other spice. Put a layer of crumbs in a pudding dish; a layer of rhubarb, some sugar, spice, more breadcrumbs, and continue alternate layers of rhubarb and crumbs, sweeting and spicing each, until the dish is full, or the material used up, finishing at the top with crumbs. Bake until the rhubarb is done and the top well browned. Following this hint, sufficient crumbs were added to the rhubarb to absorb the juice in making pies, to their great improvement. The rhubarb now gets used—if any doubt it, let them look at the grocer's bill for sugar!

Sweet Potato—"Early Peabody."—The description of this new sweet potato in March last, has called out inquiries as to where it could be procured. Mr. Peabody informs us that he has sent a stock of seed potatoes to Messrs. James M. Thorburn & Co., 15 John St., N. Y., who will, no doubt, be able to furnish plants at the proper time. Our experience shows that near New York the first week in June is quite early enough to set the plants; those put out earlier may live, but they make little growth until the weather gets "settled warm."

The National Repository, "A Christian Magazine," devoted to "general and religious literature, biographies and travels, criticism and art," is one of the best family magazines that comes to our table—94 pages per number, beautifully printed, and well illustrated. Edited by Dr. Curry, formerly editor of the "Christian Advocate." Published by Hitchcock & Walden, of Cincinnati. $3 per annum. Those desiring a first-class magazine—and what family does not?—will find this a safe, instructive, high-toned periodical.

Sundry Poultry Matters.—Health of Fowls.—"Subscriber," Ironton, Mo. To preserve a flock of fowls in robust health, it is advisable to change the male every year. This is easily done by procuring a change of eggs, and raising a brood of chicks of other stock.... **Crossing Breeds.**—To cross a Light Brahma with a White Leghorn would be undesirable. There is nothing about the Leghorn that can improve the Brahma, and if the Brahma improves the Leghorns, it can only be by adding size, and producing a mongrel which will probably be quite unsatisfactory... **Turkeys.**—To have two broods of turkeys in one season, take the poults from the hen turkey as soon as they are hatched, and give them to a hen with a brood, or take the eggs from the hen turkey after she has set upon them for a few days, and put them under a hen. The turkey will then lay another litter of eggs, and needs no visit from the male turkey to fertilize them.... **Incubation of Eggs by Manure.**—In reply to a number of enquiries, we would say that unless a person has practical knowledge of the behavior of fermenting manure, and how to so manage it as to keep a steady heat, it is more than probable that an attempt to hatch eggs in this way would fail. We would not advise any lady to undertake this business, unless it be done very cautiously, and with a few eggs at a time. To risk a hundred eggs, without having experience, is unwise, and would almost certainly lead to failure.

Sundry Humbugs.

Very few who read the articles with the above heading are aware of the difficulties attending the preparation of them. It often requires a great deal of correspondence, or much time to be spent in investigation by trustworthy parties, before we can be sure of a statement which, in the giving, may occupy but a few lines. In conforming to the rules we long ago established for our guidance—to spare no one, no matter what his position, whom we know to be a swindler, and at the same time to place no one in the select company of Humbugs, without being morally certain of his right to this distinction—we must, of course, spend a great deal of time in investigating the cases which appear here, but still more on those against whom the evidence is insufficient. There are many schemes which we feel quite sure are fraudulent, and persons whom we believe to be swindlers, that escape simply because we are unable to confirm our suspicions. A marked illustration of the difficulties attending such investigations is the case of

"THE SILVER MOUNTAIN MINING COMPANY,"

the circulars and pamphlets of which were a short time ago scattered broadcast over the country. The pamphlet was no more objectionable than such things often are, but the circular sent with it was too much after the style of some bogus concerns, to pass unsuspected. As the Company had its headquarters in New York, inquiry was made of parties who should know all about it. The information received was embodied in an item given last month on p. 129, which, while it did not put the concern down as fraudulent, should have caused any thinking person to hesitate before risking his money in it. Soon after the April number was out, numerous inquiries moved the police authorities to investigate the matter, and they ascertained that the names which our informant regarded as sound, were fictitious, and that the affair was for the purpose of "defrauding easily deceived people." It is very certain that any

PROBABLY PROFITABLE ENTERPRISES

have no need to resort to any such methods, to enable them to start operations. There is money enough at all commercial centres awaiting investment, and any enterprise that promises fair returns without unusual risks, can easily command capital.... Lotteries and the various tricks and games connected therewith, appear to have subsided somewhat since the arrests mentioned in our last, but the business is too profitable, and there are too many heavy capitalists engaged in it, for it to be abandoned. That form of lottery, in which articles, such as musical instruments, jewelry, etc., are offered, instead of money, are still operating.

"THE MERCANTILE PRIZE ASSOCIATION"

is one of these about which there are serious complaints, and is a good (or rather bad) specimen of the lot. We sometimes think that we have little pity to waste upon those who are simple enough, after all the warnings that we have given, to be caught by these games, but every now and then there occurs a case in which the losers are so much in earnest, and to whom the loss seems such a hardship, that, while we are disposed, from principle, to say, "served 'em right," we are, at the same time, sorry we can not help them. Here are two letters, both from Indiana, one from a German who understands no English, and the other from the father of a young lady, both persons being victimized to the same amount, viz., $7.50. The plan is to send a ticket informing the recipient that the ticket has drawn a prize, in both these cases a Melodeon; the price of the ticket is $1. and the one to whom it is sent is informed that by forwarding this and $6.50 for "expressage and packing," the ticket "entitles the holder to a Melodeon valued at $125." In both these cases the money was sent, and in both, of course, the melodeon wasn't. This "Prize Association" has as many names and addresses for its officers as a dealer in counterfeit money. One circular is dated far up in Broadway

—among the thousands, and the other at 234 Broadway. If one would look up 234 Broadway, he would find that Uncle Sam has gone and set the immense pile of granite he uses for a Post-office, squat upon the very place, and the shop can not be found so long as that building stands in the way. Of course, these and others who have sent money for melodeons, have placed it beyond recovery, but if it will teach them to let alone hereafter all lotteries, by whatever name they may be called, it cannot be regarded as altogether lost. But how about the express companies who play into the hands of these swindlers—are they altogether blameless?—....While there are some schools for teaching telegraphy, or in which it is taught with other branches that have an excellent standing, there is no doubt but

INSTRUCTION IN TELEGRAPHY

is made the medium of swindling operations. We have during the past few years had a number of complaints of these "Telegraph Institutes," that seem to bear every mark of truthfulness, but as they rest solely upon the assertion of unknown individuals, we cannot make them the basis of a specific charge. The most recent complaint comes from Freeport, Ill., in which a young man states that one of these Institutes opened in that place, that he, among others, including several young ladies, paid their fee, $40, in advance, and then the instructor, claiming that he had a right to do so, moved his "Institute" to a place in Wisconsin, whither his students, having paid all their money for tuition, were unable to follow him, and lost both their money and the time they had spent in getting partial instruction, while the teacher had put himself beyond the reach of legal proceedings. The complainant sends his "Certificate of Membership," upon the back of which are the "Rules and Regulations." The 9th of these reads: "It is further understood and agreed to by the person holding this scholarship," that the managers of the Institute "are at liberty any time to move their school to a point more convenient."...."Said change to be made at the discretion of the managers."—This looks very much as if introduced for no good purpose, and we advise all who are tempted to join any such school, to look closely into all the conditions before paying their money in advance.... Our caution to farmers to

BE CAREFUL WHAT YOU SIGN,

should be printed in large letters and put up in every farm house. Indeed it is not needed by farmers only, but should be observed by all. We repeat it now because the sharpers are likely to be on the road more thickly than ever. The counties of Putnam and Rensselaer, N. Y., have been in a state of excitement over patent corn-shellers—or rather over notes given for the same. Men who have been regarded as shrewd, have been taken in by still shrewder agents. It is not necessary to state details, further than to say that in some cases the agent wanted a note for the shellers, to show "the company" that they had been properly placed. The note should not go out of his, the agent's, hands, and to show how safe it would be, it was written on the note "Not Transferable." Others signed a paper, "just for form's sake," you know, accepting the agency. All was lovely for a while, but in time the "Not Transferable" notes turned up; they had been transferred—as why should they not be? Did each one not plainly read "Note Transferable!" It was so easy to add an e. Then the papers accepting the agencies, turned out to be notes pleasantly disguised. It is some comfort to know that at last accounts one of these chaps was in jail, and it is a pleasant reflection that in these counties, there being several shellers to one corn, farmers have discovered that they can be converted into capital feed-boxes for cows. Beware of signing any paper whatever for any lightning-rod, corn-sheller, patent medicine, or other vender. It is not safe to write down your name and address in a book for some of these chaps.

MEDICAL MATTERS

are unusually without novelty. There is a good deal of small-fry advertising in the papers; but the real touching, heart-rending pamphlet-account of miraculous cures is quite scarce. One thing, however, is quite too frequent. We have tried to state plainly and explicitly, that it is of no use to write to us, asking about advertising doctors. There are now some 20 letters or more, each containing an advertisement cut from some newspaper, asking what we know about the person, or what is our opinion of their medicine. Many would save themselves the trouble of writing, if they would recollect that we know nothing whatever—at least nothing good,

OF ANY ADVERTISING DOCTORS,

and our only opinion of their medicine is that it should be let alone most severely. We can not answer such inquiries individually, we have not the time, and we hope that this general answer may give us freedom from such applications for a while. We make no exceptions whatever, no matter how many titles the advertiser claims, how many cures he has made, or how many or what kind of certificates he prints. Have nothing whatever to do with them. We wish we could write a little plain language to young men, that we could show them how needlessly they were frightened into employing quacks. Be careful how you put your name or your money into their hands....We thought that the Sawbones at their surgical shop in Indiana were ahead of all similar "Institutes" in the repulsiveness of their circulars, but here is another "Institute," this time in Kansas City, which "piles up the agony" much higher. Such a lot of figures, with limbs and bodies distorted in every possible form—all in a row, looking like a set of Crandalls "Acrobats" struck by lightning; such portraits of women with faces eaten by cancer; such wens, such diseased eyes, and almost every deformity and disfigurement that can befall poor male and female humanity, we have rarely seen. Nervous people should not look at this circular, and all others should let it alone, lest they become nervous. The people at this "Institute" warrant cures, like other quacks. This concern goes systematically into business. It sends out circulars which contain a list of all sorts of diseases, and the one who receives it is requested to give the names of all his friends and neighbors who are afflicted with a mark to indicate the disease. Moreover, there is a blank on the other side, with a request to "give here the names and post-office addresses of all the school teachers you know of." People wonder how the humbugging chaps get their names!....As we opened one circular, there met our eye in large type,

"DIRECTIONS HOW TO GAIN WEALTH! HOW TO KEEP IT! HOW TO ENJOY IT!"

Here was something worth while—not only to gain wealth, but to keep it, and enjoy it—to eat your cake, and have it, too! What wonder that we looked at it with interest. We read: "To gain wealth that will last, it must be earned."—We agreed to that. Further we read: "I would enjoy myself more in giving a dollar, than deprive any one of a cent."—We began to feel a respect for this man. Glenn it is his name. Slightly crooked as to grammar—but one can't expect high moral qualities, faultless grammar, and be set out on the road to wealth, all at once. But we grew impatient as to the wealth. We read—and, at last, there it was: To gain wealth, one must sell—groceries? No. Dry-goods? No! Attleborough jewelry? Still no! Nothing less than

"PEACE IN THE FAMILY!"

The same old story, to get wealth, one must give up something—not only his own peace, but, alas, "Peace in the Family!" We would have no more of it—better be poor with "peace in the family," than wealthy without it, thought we, as we were about to throw the circular aside—when our eye caught the words: "Peace in the Family is put up in three sizes—oval-shaped bottles"—and, after all, it was only a miserable quack-medicine—and making, keeping, and enjoying a fortune, all vanished. But the things this stuff is good for: from a jumping toothache to the most dangerous diseases of females! Glenn, you are a genius! We agree with you in one statement, though not in the sense you intend it: "No family of Children is safe without Peace in the Family!"—"Let us have peace."

The Colorado Potato Beetle.—Unfortunately, but few readers in the Northern States need be told of this insect and its work. Still, there are localities which it has not reached, but where it may be expected, and while we give those to whom it is new something of its history, we may also remind others to be on their guard. The insect is in shape like a large lady-bug, of a tawny yellow color, with 12 black lines on its back. It usually has three broods, the last wintering in the ground, as "seed" for next year's crop. They come out of the ground as soon as the potato sprouts do, and lay eggs on the under side of the leaves; they hatch in a week; in the larva, or grub stage, they are reddish, and very small, grow rapidly, and soon become fat, repulsive-looking grubs, of a reddish yellow, with black spots; when full-grown, they enter the ground, become pupas, and in a week came out as perfect beetles. These provide at once for another crop. The perfect insect flies, and thus spreads from place to place. Both the perfect beetle and the grubs eat, and so voraciously that, unless checked, they will completely destroy the potato vine. When the vines are small and the beetles few, much may be done by hand-picking, and at the same time crushing the eggs, which are small and yellow and upon the under-surface of the leaves.

Later, when the insects come from elsewhere, and get too numerous, apply Paris green. Get the pure article and mix thoroughly with 20 parts of flour or plaster, and sprinkle it by means of a perforated tin-box or other contrivance, upon the vines, using very little—only so much as can be seen. Or the Paris green may be mixed, one tablespoonful to a pailful of water, stirred thoroughly, and the vines sprinkled with it, using a watering pot, syringe, or even a whisk broom. The poison does not dissolve, but must be kept suspended in water by stirring. There are numerous contrivances, patented and unpatented, for applying Paris green in the dry state and mixed with water; one of the most recent of these is the "Liquid Atomizer," made by the New York Plow Co., No. 55 Beekman street, New York, which it is claimed will distribute the poison with great thoroughness. Those who have last year's volume (1876) will find in July and August very full accounts of the insect, and useful suggestions for applying the poison. The most complete history of the insect is given in a work by Chas. V. Riley, entitled "Potato Pests," and published by the Orange Judd Co. (50c., paper covers; 75c., cloth). Other insects injurious to the potato are also described, and the natural enemies and methods of destruction are given, and all fully illustrated. It is a work which every potato grower should have and study.

"Home Building" is the title of a new work on architecture, with 45 designs of various styles. A distinguishing feature of the work is its specifications, its elaborate table of the cost of materials in different parts of the country, and descriptions of over 250 cities, towns, and villages, from New York to San Francisco. The book embodies a vast amount of information of a kind not readily to be found elsewhere. Sold by the Orange Judd Co. $5.00.

The Land and Game Birds of New England, by H. D. Minot. This is a popular work, intended for young persons who would like to know something about birds, and care but little for ornithology as a science. The descriptions are divested as much as possible from technicalities and the work largely devoted to that in which most other works are deficient—an account of the habits of the birds, which are given in a familiar style. It gives a key by means of which a given kind may be identified by its color alone. As the birds included in it have generally a wide range, the work will be found useful outside of New England. Published by the Naturalists' Agency, Salem, Mass; post-paid for $3.

Making the Most of a Potato.—Last month, on p. 127, we gave an engraving showing how to cut a potato in such a manner that each eye will make a "set," with sufficient of the tuber attached to it to nourish the young plant. It should have been stated that this engraving was reduced from a larger one in the Illustrated Potato Catalogue of B. K. Bliss & Sons, 34 Barclay St., N. Y., which contains much useful information about potatoes and their cultivation.

"Ashton Factory Filled," is a brand of salt in the highest repute among dairymen and others. Inquirers for this are referred to the advertising columns.

Ashes for Apple Trees.—"S. L. B.," Tompkins Co., N. Y. Ashes are an excellent fertilizer for a young orchard. It is not advisable "to apply them close around the trunks to prevent worms from injuring them."—Their effect in keeping off the parent insect of the borer, which is no doubt what you mean by "worms," would be only mechanical, and it may be accomplished much more surely by a strip of tarred or other paper. Strong unleached ashes might injure the bark of a young tree; at all events, applied just there, they would do very little good, as the feeding roots are at a distance, and the best use of ashes will be to spread them, if in abundance, all over the orchard, or if the supply is limited, around each tree as far as its branches extend.

The Tobacco Trade Directory, just issued from the office of "The Tobacco Leaf," a trade journal edited by Edward Burke, 142 Fulton street, New York, is a curiosity in the way of a special Directory. It claims to give the name of every person connected with the tobacco trade in the United States, Canada, and the city of Havana, and while it is a wonder to outsiders, must be very useful to those interested.

The American Veterinary Review.—The first number of the first volume of the second edition of the "American Veterinary Review," is received. It is edited by Dr. A. Liautard, and is issued in accordance with a resolution passed at the last meeting of the United States Veterinary Association. The number before us contains papers by Dr. Liautard, Prof. James Law, Prof. Very, and others, upon subjects of importance to the owners of horses, cattle, sheep, and swine. Unfortunately, capable veterinarians are very scarce where they are most needed, and the immense numbers of live stock, which reach a value of not far from two thousand millions of dollars, are either helpless in the owner's hands, or are submitted in great part to the treatment of quacks and cow-doctors. In the hands of an intelligent farmer, a veterinary work of this character will be valuable, and when helped out with some standard works, may greatly aid him in rationally treating his own animals in the absence of proper professional help.

Marketing Produce.— The produce commission business is one that offers a field for dishonest operators, and we would caution those who send vegetables, fruit, or other produce to the New York and other markets, to be careful to whom they consign it. There are two classes to guard against; those who start with good intentions, but who for want of sufficient experience soon fail in their undertaking, and those who start with the deliberate intention of cheating. Already circulars of a suspicious character are being sent among the producers, and soon the fruit growing districts will be beset by numerous glib-tongued persons, who have a plenty to say, and a plenty of time in which to say it, as to their wonderful facilities for handling and selling fruit. Raising fruit and other produce is of little avail unless it is well sold, and as it is seldom that one person can do both, it becomes necessary for the grower to entrust his articles to another, to whom he pays a commission for selling. It needs no argument to show the importance of selecting a commission merchant who is not only thoroughly honest, but has such a knowledge of the business as will allow him to get the best prices. There are numerous dealers of this class, some of whom advertise in our columns, and as to others, it will not be difficult to ascertain their reputation. It is very unsafe to consign to unknown parties, whether they make their appeals by circulars or in person, no matter what inducements they may offer, without first making sure of their ability to do what they promise. It is well to consider this matter before the busy season comes on.

The Foreign Meat Trade.—On the first page will be found a series of engravings giving scenes connected with the important and growing business of shipping meat to Europe. In the description

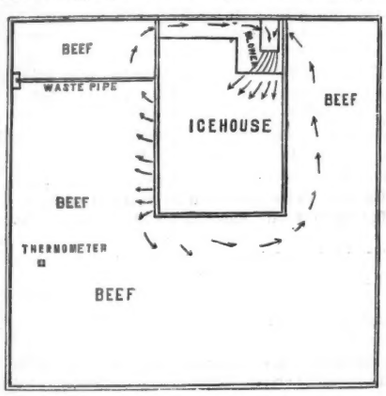


Fig. 5.—PLAN OF REFRIGERATOR.—(*See 1st page.*)

reference is made to the plan of the refrigerator, showing the interior arrangement, which is here given.

"Black Quarter," Carbuncular Erysipelas.—"C. J.," Rockbridge Co., Va. This disease is frequent at this season amongst well-kept calves and yearlings. It does not effect the half-starved ones. The principal symptom consists of large black patches beneath the skin of the legs, shoulders, or flanks, and over these patches the skin is puffed up and crackles when pressed or rubbed. It is a disease of the blood, supposed to be caused by the presence of vegetable organisms in the fluid, which destroy its vitality. These vegetable growths or cells have been discovered by microscopical examinations, and seem to be produced by the entrance of germs through the stomach. It is possible that these may exist in the water or grass, and are most abundant in the spring, when the young herbage is luxuriant. There seems to be no certain cure, as the disease is too rapidly fatal after its discovery, and the only course is to prevent it by giving, early in the spring, frequent doses of half an ounce of hyposulphite of soda, and being careful of changing the feed too suddenly.

Filling in Buildings.—W. A. Dean, Fillmore Co., Minn. The filling of the space between the outer boarding and inner plastering of a house, with sawdust or some such material, is nothing new. Sawdust, spent-tan, and the like, are valuable as non-conductors of heat, mainly on account of the air they hold in their interstices. There is no better conductor than a body of air enclosed within a tight space between the two walls. The method by which this may be easily secured, is given in the *American Agriculturist* for March, 1875, p. 89, with a diagram, to be had for 15 cents.

Chufas Again.—Some 20 years ago the Chufa, or Earth Almond (*Cyperus esculentus*), was introduced as a plant from which great things might be expected, its chief use being as food for swine. The plant is one of the sedges, and closely related to the Coco or Nut-grass, which is such a pest to Southern agriculture, and bears tubers in a similar manner; these tubers are from the size of a pea up to that of an almond, or larger, and have a sweet pleasant taste. In a few years after its introduction, nothing was heard of the Chufa, except here and there as a curiosity. Within the past year or two the interest in the plant has revived, the Southern papers are advocating its culture, and the tubers for planting are advertised in large quantities. While no definite experiments are given, it is claimed that an acre in Chufas will produce more pork than an acre in corn, and it is evident that they will be largely planted this season. The culture is very simple: the tubers, previously soaked if very dry, are dropped a foot apart in furrows made 30 in. or 3 feet apart, covering about an inch; on very rich land 18 inches is near enough for the tubers. The after culture is to clear the space between the rows with a cultivator of some kind, using the hoe in the rows. When frost stops the growth, the pigs are turned in to do their own harvesting; of course enough tubers must be previously dug for seed. The yield is said to be about 200 bushels to the acre. We noticed some of the seed Chufas a short time ago in the store of Wm. H. Carson, 125 Chambers St., New York.

Basket Items continued on page 193.

The New York Horticultural Society.

The attendance at the regular monthly meeting on April 3d, was less than usual, as at this time the florists and gardeners are in the midst of their busiest season. There were some very interesting plants and flowers on exhibition, principally from Wm. Bennett, Flatbush; G. Such, South Amboy, N. J.; I. Buchanan, Astoria, L. I.; R. B. Parsons, of Flushing; John Henderson, Flushing, L. I.; Wm. A. Burgess, of Glencove, L. I.; Wm. Wilson, Astoria, L. I., and Charles Zeller, Flatbush, L. I. There was a gratifying increase in the number of amateurs present, particularly ladies, who thronged the rooms. Many of them took notes of the articles on exhibition, reminding us of what is so generally the practice at the flower shows of Europe. The exhibitor finds his remuneration in orders for plants from the specimens he exhibits; at the same time the amateur in flowers obtains a knowledge of plants and their names, and learns something of culture. An interesting paper was read by Mr. David Fonlis, New York, on "Cut Flowers and Floral Decorations." His essay gave an account of the kinds of flowers now used for decorative purposes, and showed the great improvements that have been made, and the immense increase of the business during the past twenty years. He made the broad assertion that in no city in the world was the business of cut flowers or floral decorations done so well, or to such an extent, as in the city of New York. The essay was well received, and it was to be regretted that there were not more to listen to it.

The Adjustable Plant Box.

There are some inconveniences attending the use of small pots by those who raise tomato and other plants in the window of the kitchen or other warm room, and a box of some kind, or even a tin can, is preferred by many.

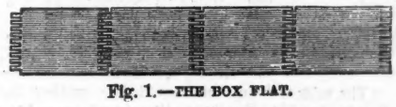


Fig. 1.—THE BOX FLAT.

Various contrivances have been proposed, to allow the box to be taken away from the ball of earth, and allow this to be set in the ground without disturbing the roots; among these we have seen none that seem so well adapted to secure this as the Adjustable Plant Box, invented by Mr. C. M. Crandall, of toy-making fame. Pieces of thin board, with similar dovetailing to that used in his building blocks, are used for the sides of the box; four of these are put together and fastened by pivots as in figure 1. It is but the work of a few seconds to put these into the shape of figure 2, when the box is ready. As many boxes as are desired are set together upon a board, which serves as a bottom for all, filled with earth, and they are ready for the plants. In a short time the earth gets so compacted, and is so held by the roots of the plant, that the box may be lifted, or may be taken quite away from the ball of earth, which will hold its shape. The readiness with which the plants may be transferred from the boxes to the open ground, may be seen at once, and the plants will be so little disturbed by

Fig. 2.

Fig. 3.—BOX MADE WITH TWO FLATS.

the operation, that they will never know it. One advantage of these boxes is their durability, and when not in use they may be laid flat, as in figure 1, tied together,

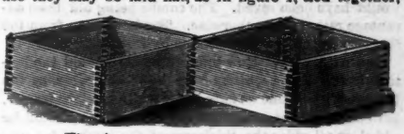


Fig. 4.—DIAMOND SHAPED BOXES.

and put away for another season. If one chooses to make a larger box, it can be done by uniting two in the manner shown in figure 3, and they are susceptible of a variety of combinations, as shown in figure 4, and others will suggest themselves to those who may wish to use them for a miniature window-box. Being General Agents for the other manufactures of Mr. Crandall, the Orange Judd Company have also the sale of these, which they offer to dealers in packages of 500 each. Those who wish to purchase them at retail, may order them of seedsmen and other dealers in horticultural wares.

Bee Notes for May.

BY L. C. ROOT, MOHAWK, N. Y.

Each month I am more convinced of the advantages of having the readers of "Bee Notes" send in such questions as they desire to have answered, as we thus ascertain their wants, and, as far as possible, meet them. Readers of the "Notes" are again requested to continue their queries. The questions at hand are of general interest, and cover the practical operations for the month.

WHEN TO TRANSFER.—"Would you advise me to transfer my bees during April?"—I consider the best time to be that when apple trees begin to blossom. Full directions may be found in "Bee Notes" for May, 1876.

COMBS WHEN BEES DIE.—"What would you do with combs in box hives in which the bees have winter killed?"—Brush the dead bees from them, and if you use movable frames, transfer the combs to these for the following season's use. They may be used for extracting, or be placed in empty hives, and swarms hived in them. If you desire to continue the use of box hives, set the hives with the empty combs away in a cool place, until swarms issue, when swarms may be placed in them. The value of empty combs is not appreciated by many.

A SUBSTITUTE FOR POLLEN.—"Do you feed rye flour early in spring?"—After bees are placed on their summer stands, I feed unbolted rye flour, ground as fine as possible, giving all they will carry. Spread it out thin on a broad flat surface.

FEEDING IN SPRING.—"Would you feed diluted honey in the spring to stimulate breeding?"—Yes, either honey or sugar syrup. I prefer syrup, as it is less likely to induce robbing.

DISCOURAGING BEES FROM FLYING.—"Ought bees to be discouraged from flying during cold and windy days?"—The loss of bees on such days is greater than is supposed. Hence we should prevent their flying.

SEALED HONEY.—"Is it important to have ample stores of sealed honey in each hive in order to secure rapid production of brood?"—There should be a moderate amount. Not enough to fill the combs that should contain brood.

SPREADING COMBS.—"After settled warm weather comes, would it not be well to spread apart the brood nest, and insert an empty worker comb, in order to accelerate brood rearing?"—I practice this largely. Do not spread combs in hives that are not strong enough to care for brood when too much separated.

LANGSTROTH AND QUINBY FRAMES.—"Are the standing frames of the Quinby hive as easily and quickly handled, when occupied by bees, as are the Langstroth frames?"—This is a question upon which beekeepers differ very much. Every person can handle those frames best, to which he is accustomed. After the first comb is removed, the preference is with the Langstroth frame, in this one respect.

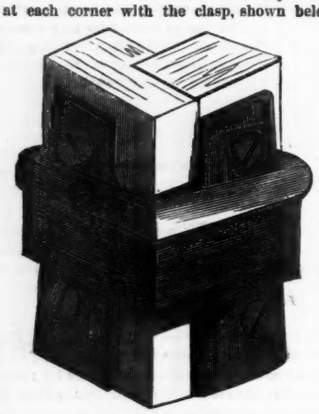
ITALIANS AND NATIVES.—"Are Italian bees preferable to natives?"—Yes, except in localities where the forage is largely buckwheat. Even there, a portion of the bees kept should be Italians, to take advantage of their working on different kinds of flowers....."Why do black

bees gather honey from buckwheat better than the Italians?"—I do not know *why*. The fact that they do so is the point of interest.

ALSIKE CLOVER.—"What do you think of Alsike clover for a forage plant as to quality of honey? Will it stand the drouth better than red clover?"—The quality and quantity of honey are good. It does not stand drouth well, but does best on moist ground. It is not a lasting kind of clover.

LOSS OF BEES.—"A. C. B." Hives that have too much honey in the fall are in very poor condition for wintering. This is without doubt the cause of your loss. Having no empty combs in which to cluster and form a compact body, they soon became frozen between solid combs of honey. If 20 lbs. of honey had been taken from the center combs with the extractor, without doubt the bees would have been saved. The combs being old is an advantage rather than otherwise. The honey ran from the fact that the combs were broken by freezing.

QUINBY HIVE.—"How long and wide should the bottom board of the Quinby hive be?"—As wide as the frames are long, and as long as the width of eight frames, with six inches each side for boxes, to which should be added on all sides the thickness of the lumber for outside case...."What is at the sides and top of frames?"—When the boxes are not in place, I use panels at the sides, and a quilt on top...."How is the outside case made?"—Each of the four sides is made separate, fastened at each corner with the clasp, shown below. I



CLASP FOR HIVE.

make them 26 in. long, 19¼ wide, and 18 in. high, inside.

HONEY EIGHTEEN YEARS OLD.—A correspondent reports a box of honey that he has kept 18 years, that is seemingly in good condition, and not candied in the cells. In referring to it, he says he desires to show that "combs with unbroken cells will keep a great while, whether the cells were capped or not."—In this I think he is incorrect. If honey is kept in a perfectly natural state, as when stored, even half as long as the box he mentions, it must be perfectly capped and sealed, and kept under very peculiar conditions. The subject of preserving honey is one of interest, and the attention thus called to it, may lead to valuable investigation.

WEIGHT OF SWARMS.—The swarms, the weights of which were reported in Feb. and March notes, consumed during Feb., as follows: the one out-doors 5 lbs; of those in-doors, one consumed 2¼ and the other 2 lbs. In March, that out-door 3¼ lbs, and the other two 1 lb each.

Helps in Sheep Shearing.

There are many helpful contrivances which tend to ease the tiresome labor of shearing sheep. To avoid stooping, the shearer may use the table shown at figure 1. This is made with a hollow, curved top,

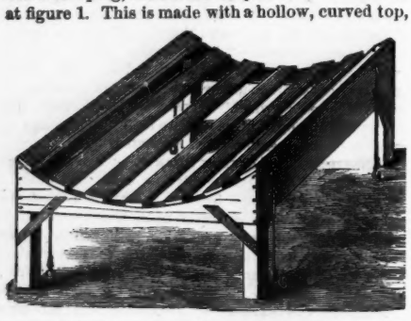


Fig. 1.—SHEEP SHEARING TABLE.

upon which the sheep is laid and secured by passing over its legs the cords, shown at each side. Each of these cords has a hook at the end, by which it is fastened across the sheep's legs, to an eye screwed

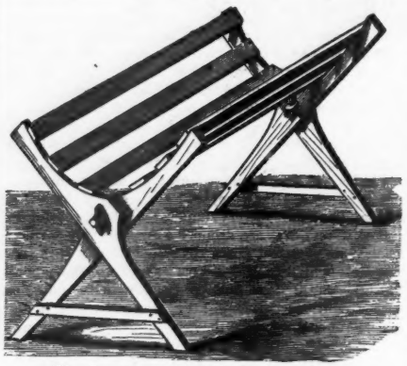


Fig. 2.—TROUGH FOR TAGGING SHEEP.

into the side of the table. When one side of the sheep is shorn, the cords are loosened, the animal is turned over, the loose part of the fleece being tucked under it, as it is turned, and the legs fastened on the other side. The shearing is then finished, and the sheep turned off. Before the sheep is shorn, it should be tagged, and a table for this purpose is shown at figure 2. The sheep is placed on this table feet upwards, in which position it is perfectly helpless, and will not struggle. Then the soiled wool about the hind parts, the belly, or the legs is clipped off with great ease, less than a minute being needed to tag a sheep. Half that time will serve for some shearers to do this. In large flocks these tables will be necessary, and those who have small ones will find them very useful.

Ogden Farm Papers.—No. 87.

BY GEORGE E. WARING, JR.

I have long known Mr. C. M. Beach, of Hartford, Conn., to be unusually careful and reliable in all matters pertaining to his dairy. Learning that he had recently given his personal attention to the testing of his herd of Jerseys, I applied for full particulars for publication, and give them herewith:

"We tested our herd for the week ending last Saturday, March 17th, taking the milk to exactly the same point as in the previous week. I believe the cows are all in calf, with the exception of three. The following table shows their condition:

Names of cows.	*Jersey Herd Register No.*	*When dropped.*	*Last calf.*	*Days since calving to March 13.*	*Age. years. months.*
Bettine	3062	Feb. 19, '70	Feb. 14, '77	28	7 1
Fantie	3066	April 6, '71	Sept. 12, '76	182	5 11
Daisy Wash'ton	3063	Feb. 22, '72	Aug. 21, '76	204	5 1
Dotha	3073	April 3, '72	Feb. 22, '77	21	4 11
Doretto	3072	Feb. 28, '73	Aug. 8, '76	217	4 ½
Roberta Gray	3068	April 19, '73	July 26, '76	230	3 11
Greta	3076	May 11, '73	Dec. 28, '76	75	3 10
Poem	3077	May 30, '73	Sept. 3, '76	191	3 9½
Faithful	3078	July 2, '73	Nov. 2, '76	131	3 8
Freeda	3079	July 4, '73	Nov. 27, '76	104	3 8
Witch Hazel 2d	2828	Mch. 10, '74	May 15, '76	302	3
Donna	4412	Mch. 24, '74	Feb. 13, '76	393	3
Kitty Clover, Gr	15-16	May 15, '69	July 27, '76	229	7 10
Aline	Guernsey	Aug., '74.	Oct. 18, '76	146	2 7
				Av. 175 d.	Av. 4.5

"The milk was only measured by counting the number of cans, but the estimate of something under 7½ qts. for a pound of butter cannot be out of the way—the cans being of the same size and filled alike as nearly as possible.

"The product of butter from the cream churned was 209 balls of ¼ lb. each, making 104½ lbs. We are feeding one calf, and in addition there were used during the week over 56 qts. of fresh milk, equal to 8 lbs. of butter. This makes a total product of 112½ lbs. of butter, or almost exactly 8 lbs. average to each cow.

"The previous week, under the same circumstances, we made 203 balls, or 101½ lbs. of butter. An exact trial of three days' milk from the herd a short time previous, gave 1 lb. of butter to 7½ qts. of milk. There is a slight variation from week to week in richness caused by feed and the quantity of milk the cows are giving. Some think we feed too high, but so far I see no ill effects, and have been doing the same for several years. These facts I am willing to vouch for."

I do not hesitate to accept this statement as being not only that of a man who honestly believes what he says, but who is also sure to say nothing that he does not *know* to be true. I am disposed to regard this as the most valuable report that we have had. Dividing the cows roughly into two classes, four came in early and ten came in late, but the average time from calving was between five and six months, and the herd probably averages between three and four months in calf. As they will come into summer keep in good milking condition, they will doubtless increase their yield on grass. In view of the season of the year and of the condition of the animals, it seems reasonable to suppose that they are not now making more than the average of their yearly product, which would carry the average yield of each one of a herd of fourteen cows to something over 400 lbs. of butter each per annum. This seems incredible. Let us suppose that we make a deduction of 25 per cent, we shall still leave an average of 300 lbs. per cow per annum. This is not the largest story that I ever heard of the performance of a herd of Jersey cows, but it is the largest that I have ever believed, and this one I do believe. The process by which Mr. Beach has attained this success, cannot probably be exactly formulated. Good care, rich land, and ample feeding, have been important items, but probably much is due to his luck in beginning—at a time when his own knowledge of the breed was slight—with a herd containing one or two unusually good cows. This has been supplemented by a shrewdness that led to keeping the best animals and selling the inferior ones. No price that any one would be likely to pay, would buy his best cow, while the less satisfactory animals were freely sold at whatever they would bring. Probably Mr. Beach does not ascribe much of his success so far as quantity goes, to the use of deep cans, but he believes that he gets an improved quality by their use.

J. M. B., of New York, writes about churns. Forty years ago he used something similar to the Bullard—a long box set on rockers. The rocking sent the cream from one end of the box to the other. This was not very satisfactory, and he tried a churn in which the dasher moved back and forth through the cream. Since then he has used many others, liking best a barrel churn, which he has used for fifteen years past. This has paddles worked by a crank; and he finds the usual objection, that, as the floats do not work close to the sides of the barrel, there is soon deposited a considerable thickness of cream which gets no churning. He thinks that this occasions a loss of from 5 to 10 per cent of the butter. This waste is probably overestimated; but if anything like this, is a serious objection to these churns. Probably the rocker churn described did not throw the cream with sufficient violence. We find that the "Bullard" does so. Mr. J. B. Williams, of Conn., has invented a barrel churn, in which the floats, when turned in one direction, for churning, run close to the sides; when turned in the opposite direction, for working the butter, they leave considerable space. I hope to try this churn this season.

The same writer asks about the strip of land on Ogden Farm, described some years since as having been injured by too deep plowing. Time has greatly improved this land, and it is now about as good as that lying on either side of it. It stood last season's drouth no better than the rest of the field. It may show an improvement when we plow it up again, but thus far it offers no argument in favor of turning down a good surface soil, and bringing up a stiff clay sub-soil.

Mr. B. also asks about "dried grass," a subject which I have overlooked for a year or two past, and whether "early cut hay" has taken its place. "Are there any experiments on record, of the effect on the subsequent crop of early, medium, and late cutting for hay?"—He suggests that valuable information would be gained by investigating this mat-

ter and recording the results. So much depends on the effect of the season, whether wet or dry, hot or cool, that such experiments, to be reliable, should be continued for many years, and should be conducted under the exact methods of an agricultural Experiment Station. I have watched the matter pretty closely at Ogden Farm, and do not see any very material difference between ordinary early and late cutting, so far as the subsequent growth is concerned; but there have been so many circumstances to be considered, that the observation has no especial value. Where we have cut very early, before blossoming (dried grass), there has always been a good subsequent crop, apparently only less than an original uncut crop, because the time for its growth was thrown into dry weather. The experience of those who irrigate suitable grasses with sewage throughout the season, shows that the second, and even the third cutting are as large as the first. Grass cut long before blossoming seems to make less valuable hay than that which is cut at just the right time—in full flower or in early seed. In a certain sense, the rowen cut late in the summer, may be called dried grass, but it is much firmer and richer than would be a corresponding growth in May and early June, when there is more rain.

I am asked whether cotton-seed meal is a better fodder for milch cows than Indian meal. Decidedly, no. It is very nutritious, very fattening, and very rich in constituents which add value to manure. It is largely used in stall feeding in England, and it is used to a considerable extent in this State, (R. I.) For beef cattle to be sold alive, it is very good, but it does not make very good meat, and is decidedly objectionable for dairy cows, being tallowy in its effect. I have found it to give butter a crumbling or flaky consistency, and have been obliged to give up its use. The fat that it produces, when fed to beef cattle, is of an undesirable character. So far as meat and butter are concerned, Indian-corn meal is vastly better.

Science Applied to Farming.—XXIX.

A Farm Experiment with Commercial Fertilizers, and its Lessons.

In the vineyard regions of the Rhine, in Germany, there are many farms in which nearly or quite all of the stable manure produced is used for the grape, which is the most important crop. For the rest of the crops it is necessary to rely upon other fertilizing materials. On one of these estates, which contains the famous Johannisberg vineyard, a series of experiments has been going on for several years, which illustrates very pointedly some of the principles that I have been trying to enforce in previous articles. Starting with the entirely correct idea that the results of field experiments are, in most cases, only applicable to the place and circumstances in which they are performed, Herr Czéh, the manager of the farm, propounded a question, in substance, as follows:

Under the special circumstances of soil and crops which obtain here, what fertilizers (that is, which ones of the more important ingredients of plant-food and in what forms) will be most profitable? Knowing that, to answer this question fully, would require repeated trials, Mr. Czéh planned a series of experiments to run through an ordinary course of rotation. On one field a ten year's course was begun in 1872, and was to be:

1st year,	Oats.	4th year,	Hoed Crops.
2nd "	Fodder Vetches.	5th "	Barley with Lucern.
3d "	Winter Grain.	6th to 10th year,	Lucern.

The soil experimented upon is a loamy sand, with a good many coarse stones. About one foot below the surface comes a compact subsoil. The field selected had borne potatoes for two years, and was pretty well worn down, and hence just adapted to the experiments. The plan of the latter was one suggested by Ville and consisted in applying to one plot a complete fertilizer, to another the same with the omission of nitrogen, while from a third phosphoric acid, and from a fourth potash was omitted, and so on, the last of the plots, seven in number, being left unmanured. The amounts of the different fertilizing materials used on each plot are shown in the table below:

Kind of Fertilizer.	Pounds per acre on each plot.						
	I	II	III	IV	V	VI	VII
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Superphosphate	357	357	....	357	357	....	....
Sulphate of Potash	178	134	....	....	....	....	....
Nitrate of Potash	....	....	178	....	178	....	....
Sulphate of Ammonia	268	....	223	357	223	357	....
Sulphate of Lime (Plaster)	312	312	312	178	....	....	....

The land was carefully prepared (by plowing, harrowing, etc.), the fertilizers mixed with four times their amount of earth, and spread uniformly over the plots, the seed sown broadcast and harrowed in with the fertilizers. The results the first year with oats are given in the table below, which, with the notes, deserves careful study.

EXPERIMENTS WITH OATS.—*Seed, sown March 27, came up so as to be visible over whole field, April 12. Crop harvested August 12.*

Number of plot.	Fertilizer.	Begun to blossom. Date.	Begun to ripen. Date.	Greatest Height of stalks. (Inches.)	Yield per Acre. Total. lbs.	Yield per Acre. Grain. lbs.	Yield per Acre. Straw. lbs.	Weight of Oats per bushel. lbs.	Ratios of weight of grain to weight of straw.	Increase of weight of manured over unmanured lbs. to acre.[8] Grain. lbs.	Increase of weight of manured over unmanured lbs. to acre.[8] Straw. lbs.
I[2]	Complete Fertilizer	July 11	Aug. 8	54	6,046	1,659	4,387	39.6	1:2.64	+ 89	+3,015
II[3]	Without Nitrogen	" 5	July 25	57	4,726	1,496	3,230	34.8	1:2.15	+ 72	+ 856
III[4]	Without Phosphoric Acid	" 10	" 30	49	6,069	1,655	4,414	39.2	1:2.35	+ 985	+1,802
IV[5]	Without Potash	" 10	" 30	43	5,665	1,704	3,961	40.0	1:2.12	+ 314	+1,409
V[6]	Without Sulphate of Lime	" 12	Aug. 3	51	6,089	1,666	4,424	38.4	1:2.76	+ 93	+2,032
VI[7]	Sulphate of Ammonia	" 12	" 3	40	5,096	1,587	4,949	40.7	1:2.55	+ 17	+1,077
VII	No Manure	" 2	July 21	39	3,943	1,570	2,373	43.2	1:2.15	....	....

(1) Except that which was contained in the superphosphate.....(2) On May 2, after a rain, strikingly dark green, at harvest time mostly lodged, the stalks 1½ times as long as those of VII, and very large.....(3) Light color like No. 7, stood up well, ears very well developed.....(4) Dark green, lodged, long ears, very thick stalks.....(5) Light green, somewhat lodged.....(6) Dark green, mostly lodged, ears of ordinary size.....(7) Dark green, large part lodged, ears of ordinary size.....(8) Minus sign (—) before the amounts of increase, resulting from the use of different fertilizers, are as indicated by the figures preceded by the sign +, II, without nitrogen, gave less than the unmanured, as is indicated by the sign —.

From this first trial the author infers "that this soil, which had not been manured since the memory of man, shows, first of all, a need of nitrogen. * * * By the application of chemical manures the total crop was increased about 53 per cent. * * * With the complete fertilizer, contrary to all expectation, the yield was not particularly better, either in quality or in quantity, (than those obtained when some of the ingredients, as phosphoric acid, was omitted.) * * * In absence of nitrogen the other materials affected the specific gravity of the grain, but made little difference with the straw. * * * For some unexplained reason, there was less grain from the fertilizer without nitrogen, that where no manure was used * * *." But these and other observations based on one year's experiments were not entirely conclusive. The next year vetches, or more accurately, a green-fodder crop of vetches, oats, peas and maize, mixed together, was to be grown. Nitrogen in the form of sulphate of ammonia, was applied to all the manured plots. The season was very dry, and the crop proved a failure. The third year, 1874, winter grain came in the regular course of rotation. Probsteier rye was sown with the same fertilizers as were used for the oats in 1872, and with similar results.

The details, though very interesting and instructive, and in some respects puzzling, would, I fear, be a bit too tedious for this place. I give, therefore, in their stead, some calculations which Herr Czéh has made for comparing the crops of the two years. Reckoning the unmanured crops as 100, the amounts of the others would be as in the first two columns of figures below. The averages for the two years are given in the third column, while the last column shows how much the crops, where the different ingredients were omitted, fell below the maximum that obtained with the complete fertilizer.

Plot.	Fertilizer.	Oats in 1872.	Rye in 1874.	Average of two crops.	Decrease from Average of Fertilising Ingredients.
I	Complete Fertilizer	153	162	157	....
II	Without Nitrogen	120	149	134	23
III	Without Phosphoric Acid	149	164	156	1
IV	Without Potash	141	152	146	11
V	Without Sulphate of Lime	153	161	157	none
VI	Sulphate of Ammonia alone	143	99	121	36
VII	No manure	100	100	100	57

That is to say, counting the average of the total yields for the two years on the unmanured plots as 100, that with the complete manure was 157. Where the nitrogen was left out, the yield fell to 134, a loss of 23, without potash it was 146, a loss of 11. But without phosphoric acid, the yield was 156, almost the same, and without sulphate of lime it was 157, exactly the same as with the complete fertilizer. The inference is clear. The phosphoric acid and the plaster did no good.

From these experiments Herr Czéh infers that the phosphoric acid and sulphate of lime have no special value in fertilizers for this particular field.

In citing these experiments, I have had two objects in view, first, to give an illustration of one of the ways in which an enterprising farmer may study the needs of his soil and crops, and second, to illustrate the principle, too little understood by farmers, and not enough appreciated by many who claim to stand in advance of most farmers in knowledge of such matters; that soils vary in their needs of plant-food, and that, if we are going to buy fertilizers to put on them, we should select the ones that furnish the needed materials, rather than to pay our money for ingredients that are not needed. Phosphates and bone manures, which make up the larger part of the commercial manures in ordinary use, furnish varying, but generally small quantities of nitrogen, and little or no potash. Their most important ingredient is phosphoric acid; they all contain lime, of which, in the superphosphates, a considerable is in the form of sulphate. In a vast number of cases these are just what is wanted. But in the one just described, the phosphoric acid and sulphate of lime did very little good. It certainly would have been poor economy for Herr Czéh to buy phosphates and bone manures for the land and crops he experimented on. Peruvian guano, which is rich in nitrogen, and furnishes a little potash, would have been better, but a large part of its value is in phosphoric acid, which was not wanted, at least not for present use. Of course, after long cropping, the conditions might be changed. But most of us can not afford to store up large excess of costly material in our soils, to be drawn upon, perhaps, a decade or a generation hence, and perhaps, never. We want our investments to bring the best return in the quickest time, and we ought to try to apply such fertilizers as will do this, and at the same time bring the plant-food in the soil into equilibrium with the needs of our crops. To learn how to do this, is the object of such experiments as I have been recommending.

W. O. Atwater,
Conn. Agricultural Experiment Station, Middletown.

Country or Village Cottage, Costing $1,000.

BY S. E. REED, ARCHITECT, CORONA, LONG ISLAND, N. Y.

This plan is designed to answer many requests for a "cosey and homelike Cottage, suited to the wants of Mechanics and Laboring people, costing from $700 to $1,000." It is best adapted to a westward frontage—with the hall, entrances, and porches protected from the north, but may be easily adapted to an opposite frontage by reversing the plan—placing the hall, etc., on the opposite side of

the main house. The width, 21 feet, adapts it to a 25-foot village lot, leaving a side passage to the rear....**Exterior,** (figs. 1 and 2.)—The *style* of any building is determined by the form of its roof; the steep and hooded style in this design ac-

Fig. 1.—END VIEW OF COTTAGE.

cords fully with domestic feelings and artistic sentiments—and is growing in public favor for suburban structures. Compared with the usual *Mansard* style is more practical, less expensive, and serves equally well. The side angles, porches, bay window, cornices, and chimneys, each of simple construction, make up a pleasing variety of parts. All superfluous ornamentation is avoided. A too common fault prevails in villages, and even in the country, of building close up to the street lines. A clear depth of at least 20 feet in front should be devoted to a flower garden, shrubbery and vines, for flowers are proper accessories of cottage adornment, and architectural ornamentation can never compensate for their absence ...**Cellar,** (fig. 3.)—Hight of ceiling 6½ feet.—It extends under the front half of the building, giving an average area of 11½x15 feet—quite sufficient for ordinary requirements.* It has two small front windows. A good ventilation may be had through the chimney; openings in the rear foundation allow a circulation of air over the unexcavated portion....**First Story,** (fig. 4.)—Hight of ceiling 9 feet, is divided into a hall, parlor, living-room, rear entry, and a closet. The hall, entered from the front porch, connects through doors with the parlor, living-room, and rear entry, and contains the main stairs. The parlor has a large bay window in the front, opposite to which is a marble shelf resting on stucco trusses. It communicates with the living-room and hall. The remaining wall spaces are unbroken, for furniture and wall ornaments. The living-room is a little larger than the parlor, has two windows, an open fireplace, a closet, and doors leading to the front

Fig. 2.—SIDE VIEW OF COTTAGE.

hall, parlor, and rear entry. The rear entry is under the platform of the main stairs—is divided from the front hall, and is to be used as the common entrance. It has doors leading from the front hall, living-room, rear porch, and the cellar stairs. The parlor may be warmed by placing a radiator under the marble shelf, and passing the smoke-pipe from the living-room through it. The cost of such a radiator is $8....**Second Story,** (fig. 5.)—Hight of center ceilings 7 feet; hight of side breast-walls 3½ feet.** The stairs leading to this story are made with a platform, placed 3 risers below the upper landing, which allows for the required head-room. The divisions provide for four rooms, a hall, and two closets; the large chamber has a double window in front, a marble shelf on the chimney breast, and a closet; the hall bedroom is designed to be used in connection with the large chamber as a child's room....**Construction.**—The excavation for the cellar is made 4 feet deep, and for the rear foundation walls 1 foot. The loose earth is graded around the foundation at completion, leaving 1½ feet of the foundation exposed to sight on the outside. The foundation walls are of broken stone, laid in common mortar, 16 inches thick, and neatly pointed where exposed to sight, and are generally even with the framework on the outside. Provision is made for the cellar stairway, by extending the adjoining walls beyond the inside of the frame to the hight of the ground, and finishing above with brickwork. The chimney is started with the cellar walls, and arranged with two continuous flues to the top. Side openings are made under the cap by inserting 6-inch earthen thimbles on each side of the flues. The top courses of brickwork are laid across the entire chimney, making a

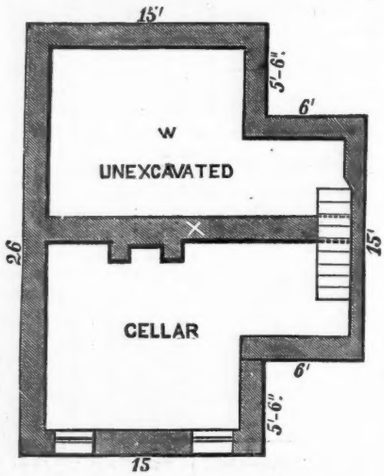


Fig. 3.—PLAN OF CELLAR.

solid and more lasting cap. Sheet-iron thimbles are put in the chimneys adjoining the parlor and front chamber. The framing, inclosing, flooring, etc., are done in a substantial manner, of materials indicated in the estimate below. Beams placed 2 feet apart from centers; rafters and studding 16 inches apart. The cornice trusses are made of 2x4-inch timber, as shown on page 129, April *American Agriculturist*, 1875, and the shingling and gutters on page 173, of the May number, 1875. Sash 1½-inch thick, glazed with second quality of French sheet-glass, counter checked, and hung to iron balance-weights with good cord. Doors 4-paneled each, for the outside and rooms in the first story, and 1⅜ inches thick; all others 1⅜ inches thick, molded, with double faces. The main stairs has a 7-inch octagon newel, a 2½x4-inch molded rail, and 2-inch turned ballusters, all of black walnut. The side walls and ceilings of the two full stories are white sand finished, on one coat of "laid off" brown mortar.

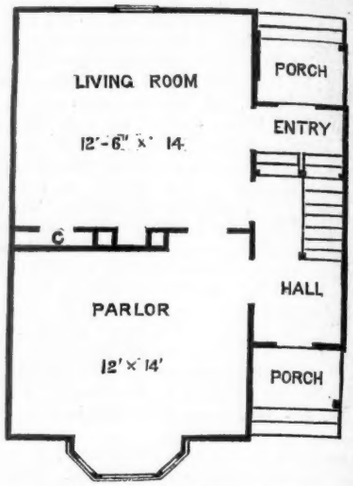


Fig. 4.—PLAN OF FIRST FLOOR.

This is the favorite mode of plastering through the Eastern States—while in the neighborhood of New York two coats of brown mortar are usually applied. Where one-coat work is properly done—more hair is mixed in the mortar, increasing its strength. The *same quantity* of mortar is used as for two coats; the advantages claimed for the "one-coat" work are, a saving of one-third in labor, and obviating the delay for the additional coat to dry. All the wood-work usually painted, and the chimney-top, have two coats of best American lead and *raw* linseed-oil; for more extended remarks on painting, see the *American Agriculturist* for June, 1875, page 212.

Estimate of materials required—and total cost:

58 yards excavation at 20 cents per yard		$11.60
26 perches stone-work, complete, at $2.50		65.00
2000 bricks, furnished and laid, complete, at $12		24.00
360 yards plastering, complete, at 25 cents		90.00
1694 feet of timber, at $16 per M		27.10
1 sill, 4x7 in. 26 feet long.	3 ties, 4x6 in. 15 feet long.	
3 sills, 4x7 in. 15 feet long.	1 plate, 4x6 in. 26 feet long.	
1 sill, 4x7 in. 23 feet long.	1 plate, 4x6 in. 23 feet long.	
8 posts, 4x7 in. 13 feet long.	14 beams, 3x7 in. 21 feet long.	
1 girt, 4x6 in. 15 feet long.	13 beams, 3x7 in. 15 feet long.	
20 ceiling strips, 1¼x5 in. 13 feet long.		
50 joists, 3x4 in. 13 feet long, at 16 cents each		8.00
200 wall strips, 2x4 in. 13 feet long, at 13 cents each		26.00
130 siding boards, at 23 cents each		29.90
160 shingling lath, at 6 cents each		9.60
40 bunches shingles, at $1.25		50.00
12 spruce plank, at 20 cents		2.40
Materials in cornices, $14; stoops, complete, $20		34.00
95 flooring, at 18 cents each		17.10
2 cellar windows, complete, at $3 each		6.00
2 single windows, complete, at $12 each		24.00
3 double windows, complete, at $15 each		45.00
15 doors, complete, at $9 each		135.00
Closets, shelving, and nails		20.00
Stirs, $50; bay window, complete, $50		100.00
Tin, (gutters, valleys, and leaders)		11.00

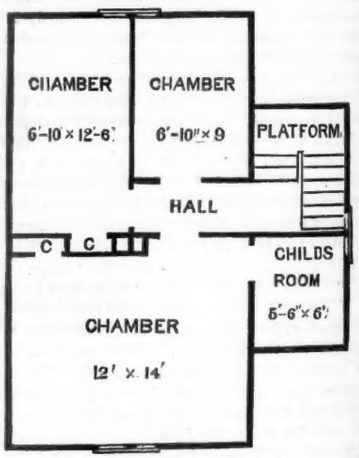


Fig. 5.—PLAN OF SECOND FLOOR.

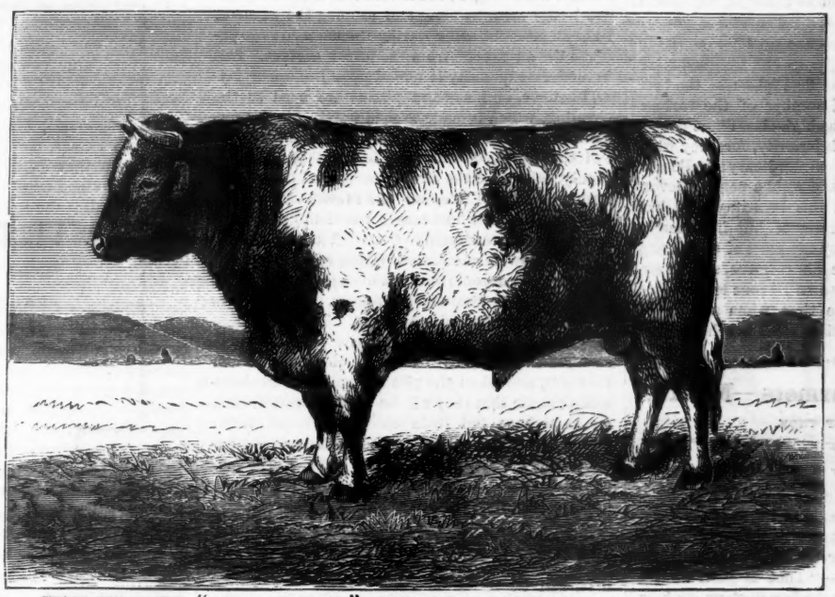
2 marble shelves, $10; painting, $80; carting, $15	105.00
Carpenter's labor, not included above	100.00
Incidentals, sink, pump, etc	50.00
Total cost	$1,000.00

* We well remember a trite saying of our boyhood days on the farm, "Always build your cellar under the whole house." Mr. Reed is studying to keep the expense low, but we would advise enlarging the cellar by omitting the wall *X*, and either making the cellar "under the whole house," or at least back to *Z*, *W*. The expense would be but a trifle more, if any, while it would give a more spacious airy cellar, needed in a small house partly for storage. If stone were not very scarce, we would advise a clear hight of 7 feet....** We would also advise making the hight of the 2nd story 7½ or 8 feet. The extra cost would be but a trifle—only for the side walls, the cost of ceiling and floor being the same. It will add materially to comfort and healthfulness to have a foot more in hight, by affording more atmosphere.—ED.

Beef Cattle—For Home Use and Export.

Value of the Export Trade to all Farmers—Best Cattle—Short-horns Cheap—Devons.

The rapidly increasing exportation of beef to England will attract the attention of farmers to the profitable employment of rearing and feeding cattle for this, as well as the home market. In one week last month, 2,330 head of beeves were shipped from New York, alone, and 550 more went from Philadelphia. In the possible event of satisfying the English demand, there are other European countries whose people are hungry for meat, and eager to pay their gold for a supply. Our advantageous situation, being in a direct and the nearest line across the ocean to these waiting markets, gives us the first chance of securing the business and confers upon us, to a great extent, a monopoly of it. We may therefore consider that the value of meat has come to the bottom, and that the present rates may remain steady, if they do not advance, for years to come. That they will advance seems even more probable than that they will retain their present level, and altogether the prospect for a steady and profitable business in this branch of agriculture, is of the most encouraging character.

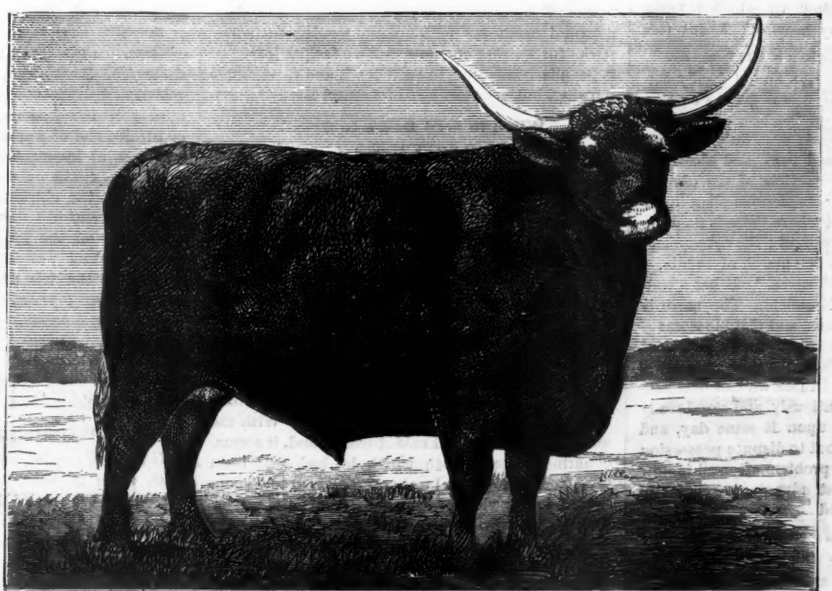


SHORT-HORN BULL, "ROYAL BENEDICT," BRED BY T. C. BOOTH, ESQ., OF WARLABY, ENGLAND.

The very intimate relation that exists between the production of meat and successful farming, is one of the settled facts of agricultural practice. The employment of rich and stimulating food not only hastens the maturity of the animals fed upon it, and returns a direct profit, but it produces an abundance of the richest manure, and in this gives a second profit. It must be remembered at the outset, that the profitably fed animal must be supplied with purchased food, in addition to that which is grown upon the farm, and that the employment of the additional capital thus expended, leads to increased profits. This is "high farming," and this term, which has been held as a bug-bear by some, means simply and only this, viz., the use of the soil in such a way as shall enable it to take in as much as can possibly be made to give out again the largest possible profit. The soil, in the hands of a high-farmer, is a machine into which he pours cheap raw materials, and from which he takes out valuable finished products. Here is the opportunity for the employment of skill and intelligence, by which man's labor is made the most productive and profitable. The most important element of success, however, in stock feeding, is to have the right sort of animals to feed. These are the machines, as it were, by which the raw material is worked up, and every person knows how much better it is to have a perfect machine to work with, than a mere make-shift. There are animals that are able to eat and digest only enough to sustain life, while they slowly grow to maturity during six or eight years, and then they are of very inferior value for beef. On the other hand there are those which can be made, by only two year's high feeding, to reach a greater weight, and make a more valuable product, than the former at six years of age. The feed consumed during the short life of the best cattle, is probably not half that eaten by the poor-stock. The saving made then by feeding the best, amounts to 50 per cent of the hay, grain, and roots used, and three years or more of time and labor. This is the plain and simple reason why the best breeds of cattle are held to be more valuable than the common stock, or the so-called scrubs. Unfortunately, of late, much of a speculative character has been given to the business of rearing and selling of the best of our breeds of beef cattle, the Short-horns. This excitement, however, is past, probably never to return. It has burnt itself out, and is extinguished. The best of Short-horn bulls have been sold the past winter at such prices that should induce farmers to purchase freely. We do not mean the fanciest sorts of fancy animals, but those of really better intrinsic value than these, because they have been more healthfully bred and reared, and are of strong, vigorous constitution, which many of the fancy ones are not. Good Short-horns are now to be procured at less than their actual value. Why this is thus we need not here say; we have heretofore pointed out why this result might be looked for, and it has come to pass. Forty-five to a hundred or two hundred dollars for a bull, is cheap enough to satisfy the most exacting farmer as regards cheapness, and it is greatly to be hoped that farmers will not miss the present opportunity of improving their stock, and beginning to raise a few of the best beef cattle, if only as an experiment.

The Short-horn is undoubtedly the most valuable beef animal in existence; that is, when crossed on native stock, and for producing grades. The grade Short-horn is a better beef animal than the pure-bred, if good judgment is exercised in procuring an excellent bull, and good cows to mate with him. This is fortunate, because it enables the farmer to enter this business of producing beeves with only a small expenditure of money.

We have very frequently described the Short-horn, and have at times given many illustrations of the best animals. We give herewith a portrait of an English bred animal, which recently appeared in the London "Agricultural Gazette." It belongs to the class known as the Booth stock, that is, it has descended from stock bred by that renowned family of breeders. The engraving is a representation of a portrait, not a photograph, but it is singularly free from the exaggerations usual in artists' pictures. It represents "Royal Benedict," owned by T. C. Booth, Esq., and a very good typical Short-horn, and an excellent beef animal.



FAT DEVON OX, BRED BY MR. KIDNER, OF ENGLAND.

But, however excellent this breed of cattle may be, it cannot fill every place. There are localities where some other breed would be more profitable. In the grand meadows of the Western States and the rich bottoms of the great eastern rivers, the Short-horn will supplant every other breed, because it is there the most profitable. There are, however, hilly or upland districts, where the pasture is not so luxuriant; lighter, more active animals will be more profitable and preferable here, and also where oxen are frequently used for a period as draft animals, and are finally fed for the butcher. In these localities the Devon perhaps excels all others. This breed is the most ancient pure-bred race of domestic animals, and has held its place for hundreds of years. It is the best breed of all cattle for working oxen; it is strikingly handsome in form and color, and although it has not the heaviest carcass, the beef is of the best quality. As a beef animal it can never lose the first place in such localities as above mentioned. Notwithstanding the severe competition which exists in England amongst

the beef breeds, and the excellence of the Short-horns, it often happens that the Devon wins the first prize there. This was the case at the last Smithfield Butcher's Fat Cattle Show, at which the Devon ox, whose portrait, from a photograph (originally appearing in the "Agricultural Gazette,") is here given, was awarded the first premium for the best beef animal. It is rare that so beautiful an animal is seen. Its square outline, filled in with a perfect roundness of substance, makes up a figure rarely paralleled. This ox was 4½ years old, weighed 2,128 pounds, and was given the first place as the best animal out of the large number of the various breeds shown. It beat many high-class Short-horns, not on account of their inferiority, for they were very good, but by its own extraordinary excellence. The picture is a good study of what a perfect Devon may be, and the fact that this favorite breed has lost nothing of its old excellence, but has merely been obscured for a time by the glare of popularity which has surrounded the Short-horns, should encourage those who already own Devons to cultivate their herds, and bide the time when a wave of deserved popular estimation shall reach them.

Among the Farmers.—No. 16.

BY ONE OF THEM.

A Ton of Fodder for a Ton of Manure.

C. and I were discussing Prickly Comfrey the other day, when I told him that I thought it quite likely that if he could manure it as he does rhubarb, he would get as big a crop of leaves as its wildest advocates claim.—"That is just what I want," said he, "and if anybody will show me how to turn a load of manure into a load of dry fodder, it is all I want."—Sure enough, that puts the whole case in a nutshell—only the fodder must be good. It must impart no flavor to the milk, and it must dry easily, and keep well when dry, and be palatable, otherwise one might as well have the manure. Now as to this Prickly Comfrey, there is one question no one seems able to answer: "Will it become a weed and a nuisance?" We know it grows rampantly, lives through the winter well, and that an inch bit of the root will grow; so the more it is plowed and grubbed the more it will spread, for aught that I see. It is first cousin to common old-fashioned garden Comfrey, of which I know little or nothing except by hearsay. About this

Col. Frank Curtis makes a Statement.

He says that, many years ago, an old family servant, of the colored persuasion, was given a cottage and garden spot not far from the house. "Rheumatiz," and other pet ailments were duly ministered to by hot bricks and sand bags, and Comfrey, which was an indispensable article of the old negro's *materia medica*, had a conspicuous place in the garden. The old soul went where there is no more hard work nor rheumatic twinges; the cottage and garden were swept away by the march of events,—but the Comfrey—that "still lives." It has a constitution as if it grew at Marshfield. The more it is mowed the wider it spreads, and if it blossoms—then it disseminates. [We think that a sufficient reply to our correspondent's doubt is given on page 130, last month.—ED.] So I think we had best handle our prickly blessing cautiously, and stand ready to pile salt-hay or straw upon it some day, and smother it, if it really sets out to dispute possession of the land with us. The problem after all is how to apply manure to the best advantage. So far in the experience of the world

The Cereals lead as Fodder Crops.

When we find something which will convert a ton of manure into more and sweeter and more nutritious fodder than Evergreen or Mammoth Sweet Corn, we shall have made a long stride in advance. If the new French method of preserving green corn fodder in pits for winter use, somewhat as the Germans preserve cabbage in the form of sauerkraut, is going to work well, it would be difficult to say exactly what in reason we could want more. There is something in this tanking of fodder crops, and I am confident it is not applicable alone to corn fodder—but think that all kinds of green feed may be preserved in some such way.

Pitting Green Fodder

is done by preparing tight pits or trenches, running the corn fodder through a hay cutter and into the pits, mixed more or less with straw or other dry fodder, according to the amount of moisture present in the corn, treading and packing the whole as tight as possible, and covering the mass so as to exclude the air except from the upper surface. Salt in moderate quantity is added upon the upper layer, I believe, and hay and planks are used as the covering, which is made to shed water. Active fermentation sets in, which causes the mass to settle, and the pit needs watching to see that it settles evenly, otherwise the air will enter, and the violent fermentation will keep up, and inevitably result in the decay of the whole mass; but if the exclusion of the air be reasonably effected, I conceive that the very slow fermentation which will go on, will furnish just carbonic acid gas enough to render the very incomplete exclusion of the air, by the topping of hay and planks, quite effectual. This is preliminary to a proper protection of the pits with earth for the winter. The earth is piled on as we cover root pits, and when the pits are opened, care is requisite again that they will be well stopped, so that air shall have but little access. We all know how it is with our cider barrels; so long as the fermentation goes on with sufficient activity to be perceptible when the ear is laid over the bung hole, there is no danger of the cider becoming vinegary and hard—but when this ceases, the air will soon get to the cider and spoil it, if it be not prevented. [A detailed account of this process, with engravings, will be found in the *American Agriculturist* for June, 1875, page 223.—ED.]

Wooden Harrows and Clod-crushers.

When I first came into this neighborhood, wooden harrows were very common. We found one on the place and used it up. It was a large sized A-harrow, of oak throughout—I should say, white-oak beams and yellow or black-oak teeth. These were two inches in diameter, round, about ten inches long below the beam, and about four above. It was not of very heavy draft, and did fair work as a harrow, and when turned upon its back and used as a clod-crusher, it did admirably. I used to throw a log-chain over the outside teeth, so that the tracks of the teeth should be obliterated, and thus a capital finish was made. I am getting out some sticks for another one now, for we feel its loss. It is peculiarly adapted to light land, and to stubble-plowing, but is not so good on sward land.

When to Seed Down to Grass.

I have not a doubt that August is the best time. Grass sowed then looks well now, though it hardly started perceptibly before frost, and it appeared to grow but little after that. Even that sowed with late rye is starting now finely, and will stand a drouth much better than any spring sown grass possibly can. Oats seem to be so much a necessity to horses, that I have favored seeding down with that crop, and raise generally only rye enough for what straw we need. But last summer's experience is a warning. I met Mr. Barstowe, of Norwich, Ct., a life-long dealer in implements and seeds for farmers, and he appealed to me to know what time of the year it was best to sow grass seed. With the manner of Sir Oracle I said *August*,—and, it seems, confirmed some advice which he had just been giving. For my part I was very glad also to be confirmed in my view by so experienced an observer. Rather than sow grass seed with oats, and take the chances of the summer, I think it will pay to plow the oat stubble, and sow the grass and clover together as early as the oats can be gotten off the land.

Trees by the Roadside.

It is so much easier to cut down than to set out a tree, and so few people really know what a tree is worth, that I almost despair of ever seeing roadside trees valued and cherished as they should be. There is hardly a roadside fence or wall, against which trees, which would be both ornamental and useful, do not spring up. It would hardly do to let them grow by the wall, for they might throw it down, but we are quite too apt to let them grow by the fences. In fact, there is many a fence in this neighborhood made quite sustantial by the red cedars, which fairly hold it up. If these could be properly thinned out, and the brush trimmed out around them, it would be but a few years before thay might be used as fence posts for either rail or wire-fencing. Trees of other kinds may be put to the same use, while at the same time they will grow large enough to shade the foot-path, and afford timber for fuel or other uses after a few years. The drafts which maples, tulip-trees, sweet-gums, basswoods, hickories, ashes, and probably many other trees, make upon the soil is very little, even when they stand in cultivated ground; but when they stand on the fence line of the highway, or better still if the road be wide enough, four feet from the fence, they will make no perceptible draft upon the fertility of adjoining fields. Elms, and several of the soft-wooded trees, poplars, willows, etc., are different, and, being surface feeders, send their roots into the soil to great distances. Still, even these are better than no trees by the roadside, and the elms are especially adapted to the vicinity of dwellings, and in village streets (but not too close, so as to over-shadow houses and cause dampness), for in such places there is much unused ground where the tree may send its feeding roots without harm to valuable crops. What we need is a public sentiment in favor of preserving and protecting trees along the highways. So soon as the roads about any otherwise unattractive neighborhood are well lined with trees, it gains a reputation at once as "picturesque" and "charming." If it is anywhere in the vicinity of large towns, the price of building sites goes up, and the people appreciate trees. There is a feeling through the land that village streets, or the streets of houseless "cities," should be marked by shade trees. So maples, dug in the swamps and trimmed to bare poles, are set out 50 feet apart on each side of the so-called *streets*, and generally die of neglect or goats the first season. Why should not we think just as much of trees along our pleasant winding country roads, as where we have a "city" laid out in rectangles?

Rats and Mice.

These vermin do not agree, and rats will soon drive mice away, so that when the latter get really numerous, and shrewd enough not to enter traps, as they often are, the incoming of rats may be hailed with gladness, for they are much more easily destroyed. Last winter a neighboring farm-house was nearly overrun with rats. They were undermining the foundations, destroying a basket or two of turnips and of apples every night. They would not look at traps; they were too numerous for cats; they could only be poisoned at the risk of destroying the chickens, for all ordinary poisons make the creatures sick, and they run out of doors and throw off the load upon their stomachs, and this it is that poisons the chickens. Some one mentioned the use of plaster of Paris (calcined gypsum), so I brought some up from town for them. It was mixed dry with wheat flour and Indian meal. The rats ate this; it *set* and *settled* them, and we laughed over this mortar mortality; but it does seem cruel—no worse, however, than poisoning with arsenic.

Watering Manure Heaps.

If manure can be kept where it is always filled with water in which it is partly submerged, and which fills the rest of the heap by capilarity, it will neither heat too much nor lose anything by evaporation. It is usually not difficult to manage this in barn cellars, or under cover, provided it be built up over a tank or lie in a tight basin. In warm weather, however, evaporation goes on so rapidly from the spongy heap, that, unless water is pumped over it, or in some way be present in abundance, it will heat—burn—"fire-fang" tremendously. The treading down of the heap by cattle is alone not sufficient, unless the admixture of cow-dung be considerable.

We have been busy getting out manure lately, and I have been impressed with the fact, that it is not that which is least fermented which is really

the best, but that in which there has been a regular but controlled fermentation. In one case, the cornstalks are still tough, the straw, swamp-hay, etc., saturated with liquid and incorporated well with the solid manure, but n no fit shape for plant-food. On the contrary, in those portions of the heap, where the strawy mass could absorb the liquid manure, and be sprinkled frequently by water thrown over the heap from that which leached into the low parts of the cellar, all the vegetable fibre was rotten and easily cut or broken, and at the same time there was no odor of escaping ammonia. The fermentation had obviously gone on almost all winter, though the surface was frequently frozen.

Will the Potato Beetle trouble us this Year?

I have been comparing notes with Mr. Henry E. Acker, of Woodbridge, and he gives me the following facts. Ths ground dug over for hot-beds and greenhouses in the fall of 1875 was found well stocked with the pupæ; that dug over last autumn contained few, if any. In digging over the ground in the greenhouses last year, the beetles or the pupæ were frequently met with, this year none are observed. When he set out his tomato plants last May and June, the first setting were almost all destroyed, consumed by the beetle in one stage or another, and other plants to the number of several thousands had to be provided. As soon as a good stock had been established, there was no more trouble, and hardly a beetle or grub was seen upon the plants the rest of the season. Mr. A. raised no potatoes, but kept watch of the insects, and was surprised to see so few during the latter part of the season. In fact the only place where he observed them in considerable numbers, was along a stretch of beach, where they were washed up, and remained alive for a long time. It was the experience of many potato-growers that after the drouth became severe, the beetles were no more troublesome. The question is, was it the drouth, or were the pests discouraged from some other cause. I think those who refrain from planting potatoes in about the usual quantities, either from fear of the beetle's ravages, or on account of the high price of seed, will do a very foolish thing.

Home-Made Phosphate.

A Subscriber, Schuylkill Co., Pa., gives the following method of making a bone fertilizer. I have used for some years, with good effect, a fertilizer made as follows: I get annually a few tons of raw bones, and burn them with wood, when they become very brittle, the grease being extracted. I then break them small, either with a heavy mallet hitched with a spring-pole, or run them through a small mill with horse-power; in this condition they are not much harder to grind than coffee. I then pack the ground bones in layers in old oil-barrels, and pour upon each layer, stirring as mixed, enough dilute sulphuric acid, (oil of vitriol), one part acid to three parts water, to moisten them. In a few weeks all the bones are decomposed, and the mass is dried by using a little gypsum (land plaster), so as to be easily shoveled out. By this method the farmer can manufacture his own superphosphate, not only at a minimum cost, but with absolute reliability." [This process is upon the whole the most simple one by which the farmer can utilize accumulated bones. It is not alone the grease that is lost in burning, but the gelatine is also more or less completely consumed. Fresh bones contain, on the average, about one-third their weight of animal matter, *ossein*, which, by the action of water, is converted into gelatine or glue. This contains nitrogen, and by decomposition affords ammonia, and a superphosphate thus prepared will be destitute of ammonia; but it will be cheaper for the ordinary farmer to supply ammonia in guano, fish-scrap, or other commercial fertilizer, than undertake to convert raw bones into superphosphate. Those not accustomed to handling sulphuric acid, should use great caution. When superphosphates made on the farm were first proposed, accidents were so numerous, often so severe as to cause the loss of eyes, that we discouraged the attempt to make them, and would now advise only those who can use proper care to do so. Sulphuric acid is exceedingly corrosive, and should be handled with a full knowledge of the fact. A drop thrown into the eye will be likely to destroy that organ. It should be poured from the carboy slowly and gently, to avoid all gurgling. Stone-ware or glass vessels, only, should be used for strong acid, and unpainted wooden ones for diluted acid. A stone-ware pitcher, of known capacity, will be found the most convenient vessel. In diluting the acid, measure the required quantity of water into a tub or bucket—three, six, nine, or whatever number of pitcherfuls, of course leaving room for the acid to be added. Drain or wipe out the pitcher, and fill it with acid; then pour the acid in a small, steady stream into the water, until a fourth or smaller part has been poured in; then cease pouring, and with a stick stir the mixture; add another portion of acid, stir again, and so on, until all the acid is added. When the acid first strikes the water, there is sometimes a sputtering, and this, then and at all times, one should be on his guard against. When the acid and water combine, the liquid becomes very hot. Have at hand some old soft rags, and if any acid falls upon the skin, immediately wipe it, or rather *sop* it up, before washing the spot. It is well to have at hand some water of ammonia, or a solution of sal-soda, to neutralize any acid that may accidentally fall upon the skin or clothes. It is better to wear clothes that can not be spoiled. A little dust, a chip, straw, or such matter, will cause the strong acid to become dark-colored, but does not injure it.—ED.]

A Dairy Barn for Twenty-five Cows.

A correspondent requests a plan for a barn for a dairy of 25 cows. The arrangement of a barn for a dairy should be well considered, as regards saving of labor in milking, feeding, and cleaning, all of which are of great importance, as well as regards the first expenditure of money for the building. It is a frequent mistake that the buildings of a dairy farm are more substantial and costly than necessary. Room is wanted for the convenient management of the cows, but there is no necessity for elaborate construction, or for heavy and costly frames for the buildings. Floors are unnecessary, in fact are not advisable, if of wood; light paving of small cobble-stone, or concrete of gravel and lime are no more costly, and greatly more healthful and cleanly, and perfectly free from vermin. The whole series of buildings for a dairy farm, may be made of a succession of cross-bents, connected together by girts and plates of light timber. The use of the horse-fork dispenses with the necessity for high, wide barns for storing hay and fodder, and in place of these there may be long low sheds, along the peak of which the horse-fork may be carried on its travelers, and beneath which may be the cow stables, milking sheds, calf pens, horse stable, and wagon sheds. The form of the bent to be used is shown at fig. 1. It is 20 feet wide, 16 feet high

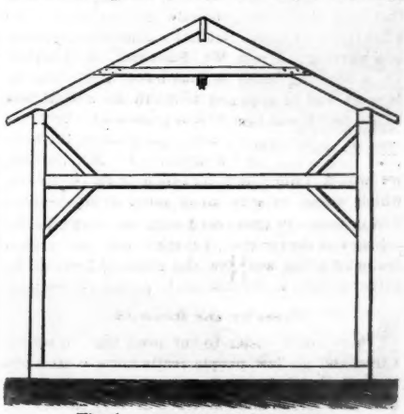


Fig. 1.—BENT FOR DAIRY BARN.

at the posts; the timber for the sill and posts is 8x8, that for the girt is 6x8, for the braces 4x4, for the rafters 2x6, and a collar-girt of 2x6 is used to strengthen the rafters, and to support the carriage for the hay-fork. In building with these sections, the sills may be bedded in concrete, either wholly or partially, or may be laid upon the concrete, but in the latter case should be so fitted that no water or air can penetrate beneath them, to cause rapid

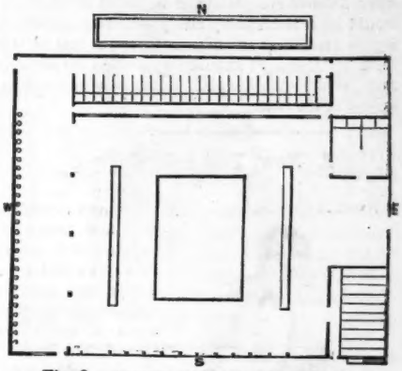


Fig. 2.—GROUND PLAN OF DAIRY BARN.

decay. To wholly bed them is the best plan; then an even, unobstructed floor may be made from end to end of the building. For the plan of the building, we suggest that in figure 2, of which an isometrical view is given in figure 3. On the left is the milking shed, open in the front or to the yard; from this is a passage-way to the stable, which is provided with 25 stalls, or stanchions, as may be preferred, each 4 feet wide, and a close pen for the bull at the end, 8 feet by 10. The stable is arranged with a feed-passage, 6 feet wide, in front, a feed-trough, 1½ foot wide, a floor, 4½ feet wide, a manure drop and drain, 2 feet wide and 6 inches deep, and lastly a passage, 6 feet wide, in the rear, thus

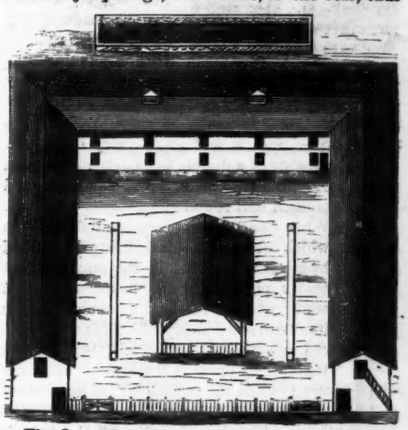


Fig. 3.—ISOMETRICAL VIEW OF DAIRY BARN.

occupying the whole width of 20 feet. The nearest corner of the second wing is occupied by the feed-room, with cutting-box, mixing-trough, pump, feed-bin, feed-barrow, and other needed furniture, and is 20 feet square, which will give ample room. From this a door opens to the feed-passage, another opens from the feed-passage into the yard. The horses in the stable adjoining can be fed from the feed-room. Beyond the horse-stable, with its two double stalls, is the wagon-shed; then the calf-pen, arranged with separate close stalls for each calf, so that no two calves may ever be kept together; a very important precaution, by which many calfish tricks and vices may be prevented. A yard, with manure-pit, covered with a roof, if wished, is in the center, and feed-racks are placed on either side of the yard. A tight fence encloses the whole. Over the calf-pen may be a storehouse, poultry-house, workshop, or any other needed apartment, and an outer stairway and door may be made to these, or this may be made in the wagon-shed. The whole length of the sheds should be 260 to 300 feet. The main stable will be 110 feet, and the wings should be at least 75 feet each. Nearly the whole of the upper floors can be used for

for storage of hay, fodder, and feed. The whole should be enclosed with upright boards, battened on the joints, and the material will cost about $500. The timber in each bent, of which there would be 25, is about 400 feet, and 9,000 feet of boards would be required for the walls. Two hundred and fifty dollars ought to pay for the labor of building, and, when finished completely, if at a cost of $1,000, it would be a remarkably cheap structure, considering its usefulness and capacity. In the rear of the main building a pit should be provided for the manure, as shown in the plan, which must necessarily go out at the rear.

A New Post-hole Digger.

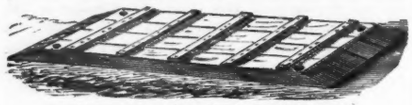
When at the Centennial Exhibition, we noticed a quite new post-hole digger, which excelled any we had previously seen, for the ease and rapidity with which it could be worked. The digging of post-holes with picks, spades, or shovels, is a manner of doing a work with the worst possible tools, nevertheless we had no very good substitute for these inconvenient implements, until the inventor of this machine hit upon the very valuable idea, which he brought into practical use. With this digger, a hole may be made of the smallest size needed, without taking out more earth than may be necessary; the hole, in fact, may be made so small that the post may be driven into it, and so set very firmly. It consists of a double handle, made to open or shut upon a pivot, with a scoop or round pointed half-round shovel upon each half. When closed, it appears as at figure 2, in which condition it is forced into the ground by repeated thrusts, in the same manner that a pointed bar may be driven. When sufficient earth has been loosened to make its removal necessary, the blades are pressed into the loose earth, and then brought together by opening the handles, as at figure 1, when the earth held between them may be lifted out and deposited on the bank. This is repeated until the hole is deep enough. Holes can be dug in any kind of soil, amongst stones, in coarse gravel, or in earth that is saturated with water, or even under water. The tool may be used for sinking or cleaning wells, for making holes for setting plants or trees in gardens, as well as making post-holes, and many made with long handles are in use for setting telegraph poles, for which holes 7 feet deep are required. It is known as the Eureka Post-hole Digger, and its novelty and plainly apparent utility made it a conspicuous object of curiosity for a small crowd of people at the Centennial, where it was very vigorously worked by its exhibitor. The length of the blade is 9 inches, the whole length of the tool is 5 feet, the weight is 9 pounds, and it is obvious that no stooping is necessary in using it.

Fig. 1.—AUGER IN USE.

Fig. 2.

A Useful Clod Breaker.

There are many clod-crushers in use that are more or less effective, but some of them require for their construction materials which are not always easily procured. One for which the stuff can be found almost anywhere, may be made of planks fastened together by cleats, as shown in the



CLOD-CRUSHER (SHOWING UNDER SIDE).

engraving. The planks should be thick and heavy; three inch oak planks would not be too heavy. They may be six or eight feet long, and the floor three or four feet wide. The forward ends of the planks are beveled upon the under side, to enable it to ride over the surface easily. The cleats are fastened underneath by carriage bolts, and consist of narrow strips, placed about a foot apart. When the crusher is drawn over a cloddy surface, the edges of the strips either crush the lumps, or drag them up and cause them to roll underneath the heavy planks, by which they are broken up. This drag may be used for covering seed sown broadcast, leveling drills, covering corn, and for many other purposes which will suggest themselves. It may be drawn either way if both ends are beveled.

Hints and Helps for Farmers.

BY L. D. SNOOK, YATES CO., N. Y.

A BAR FENCE.—Various forms of post and board

Fig. 1.—PANEL OF A BAR FENCE.

fences are in use, but that shown in figure 1 has several good points, and is not open to any serious objections. Common fence posts are used, and are either set or driven; when 14-foot boards are used, the posts are placed 13 feet apart, from centre to centre. Short inch boards, four or five inches wide and about four feet in length, are nailed within two and a quarter inches of the side of the post by three large nails, from 4½ to 5 inches in length, which is readily done by placing a block of that thickness between the post and the strip attached to it, while the nailing is being done. The bars or fence boards rest upon these nails. A sectional view is given in figure 2, showing how the boards rest upon the nails. The advantages of this fence are its cheapness; that any one section is easily removed, for passing through with a team, or stock, etc.; that, should the posts heave, they are readily driven in the proper position without the danger of splitting the boards or breaking the nails; and, should a post or board rot or be broken, another can be substituted without much inconvenience. [In place of the nails suggested by Mr. Snooks, we would rather use half-inch bolts or spikes, which would be very much more durable.—ED.]

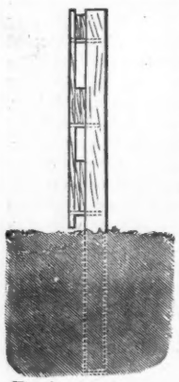


Fig. 2.—END VIEW.

WATERING PLACES FOR STOCK ON LEVEL LAND.—It is frequently the case that there are underdrains of living water passing through level fields,

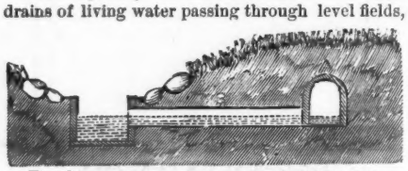


Fig. 3.—TAKING WATER FROM UNDERDRAIN.

in which there is no water available for stock. In such a case, a simple plan for bringing the water to the surface is shown in figures 3 and 4, in which is shown an underdrain of stone or tile, a pipe of one or two-inch bore of wood or tile, and about 15 feet in length, is laid level with the bottom of the drain, and connecting with a box one foot or more square, sunk into the ground. If the soil be soft, the box is surrounded with stones as shown. A low place or small hollow at some point along the drain is selected for the watering box, or, should the land be

Fig. 4.—THE WATERING PLACE.

nearly level, then with plow and scraper an artificial hollow is soon made at any point desired. Two fields may be thus easily watered by making the box two feet in length, and placing it so that the fence will divide it.

HOW TO LEVEL WITH SQUARE AND PLUMB-LINE.—The common carpenter's square and a plumb-line may be made to serve as a substitute for the spirit level for many purposes on the farm or elsewhere, when a level is not at hand. The manner of getting the square in position to level a wall, for instance, is shown in figure 5. A piece of board, three feet in length, having one end sharpened, is driven into the ground for a rest; a notch is made in the top of the stick large enough to hold the square firmly in position, as shown in the engraving. A line and weight held near the short arm, and parallel to it, will leave the long arm of

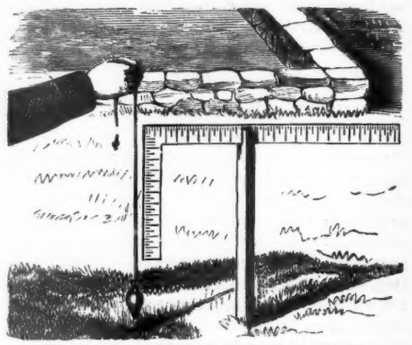


Fig. 5.—MANNER OF LEVELLING A WALL.

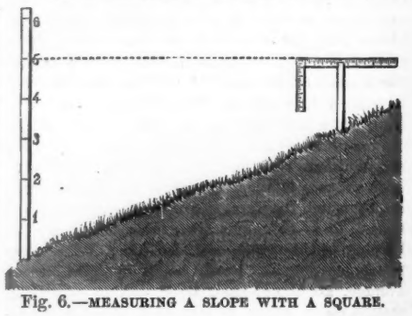


Fig. 6.—MEASURING A SLOPE WITH A SQUARE.

the square level. By sighting over the top of the square, any irregularities in the object to be leveled are readily discovered. A method to find the number of feet in a descent in the ground is illustrated by figure 6. The square is placed as before directed; then a sight is taken over and along the upper edge of the square to a pole or rod placed at a desired point. The point on the pole which is struck by the line of sight shows the difference between the levels of the two places. This method will be found applicable in laying out drains, where a certain desired fall is to be given to the ditch.

Portable Pig Pens.

Mr. L. N. Bonham, Oxford, O., sends a sketch of a portable pig-pen, illustrated by the accompanying engravings. He writes: here we raise Poland-China or Magie hogs, and ship large numbers to all parts of the country for breeders. We give our stock good care, looking to their comfort and health. So free have our herds been from that terrible scourge, hog-cholera, that some breeders think that it is like typhoid fever, among mortals, only nature's avenger for the careless and wanton defiance of her common laws of health.

Fig. 1.—THE PORTABLE PEN COMPLETE.

I was led to devise this plan for a pig-house, in my desire to secure comfortable quarters on fresh sod for my breeding sows and their young litters, and so satisfactory is it, that many neighbors have already adopted it. By this plan we secure a clean place, fresh grass, and pure air, and more sunlight in the bed than is gained by the usual sheds or houses provided for pigs. The open front faces the south; the sky-light slopes to the south; the front may be opened or closed according to the weather, and if it is wished to build very cheaply, glass is omitted altogether, and a movable cover put over the front opening of the roof, which can be open in sunshine, or closed if cloudy or stormy.

One man can remove it from place to place, so as not to allow it to remain on one spot so long as that the bed may become dusty, or the grass in the vicinity of the house tramped to death. By this plan families are kept separate, and the sows farrowing are not disturbed by the squealing of neighboring pigs, and consequently it will prevent much loss at this critical stage of the young pig's existence.

This pig-house, all complete, (see fig. 1), will cost less than $3, if a shutter be used on the sky-light,

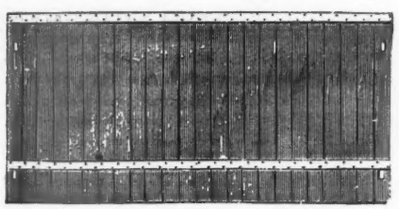


Fig. 2.—BACK OF THE PORTABLE PEN.

instead of the sash. The roof is made of good flooring, and laid in white lead and well painted. Dressed stock lumber is used for the siding; yet I have some sided with tongued and grooved flooring, and think it the best and warmest. The rails

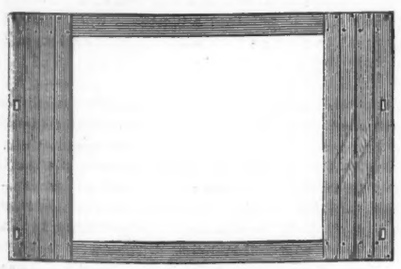


Fig. 3.—FRONT OF PORTABLE PEN.

for roof and ends are 2x2 pine or poplar, and rails for front and back 2x4. The bottom rails of the back are set 8 inches from the bottom, and the siding is nailed on the 2-inch face, which gives, when set up, a *safe-guard*, 4 inches wide, and prevents the sow from crushing pigs against the siding. The bottom end rails are placed 6 inches from the bottom to pass the above. The rails of the front are set on edge, and the two side or end pieces are nailed on the 4-inch side, projecting one inch over the ends of the rails. The bottom rail keeps the heading from working out, and is not too large for a sow to pass with ease.

After making the back, fig. 2, and front, fig. 3, the side rails in fig. 4 are put in the holes (figs. 2 and 3), and the draw pins driven; the siding for the ends, fig. 4, is put on, up and down, the slope cut for the roof and sky-light; the notches are cut in the ends, for the rafters; the rafters are cut 4 in. longer than the house, and are laid in the notches so as to project two inches at each end; the roof is then raised upon the rafters.

We find here, that houses 5x6 ft. are large enough for young sows, and 5½x7 ft. large enough for the largest. In stormy or cold weather, I have a movable front, which is set in with the swinging door, and held in place by two buttons. When my spring pigs are large enough to wean, I remove my houses from my grass lot to some less conspicuous place, and allow the grass to recover and freshen up. If the houses are not needed in the wood-lot or field during the summer, I take them down and put them

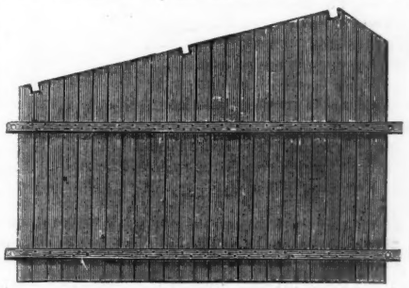


Fig. 4.—END OF PORTABLE PEN.

under cover. I can thus promote the comfort and health of my pigs, and secure neatness on the farm.

A New Cotton Seed Huller.

A Method of Utilizing the Seed for Feed—Valuable to every Cotton Grower.

The importance of utilizing cotton seed on southern farms, as feed for stock, has been frequently referred to in these columns. The fact that the kernel of the cotton seed is the richest of all grain food, renders it not only desirable that it should be made use of in feeding, but makes it imperative as a matter of economy, that southern farmers should not waste this, one of their most important resources. To make this seed of use as feed, it must be deprived of the hulls, and hitherto there has been no perfect means of separating the kernel from the indigestible and injurious envelope. This may now be done perfectly and cheaply by the use of the very simple machine here illustrated. This is Kahnweiler's Cotton Seed Huller; a general view of the machine is given at figure 1, and a section showing the construction at figure 2. Some very effective improvements have been made in this machine, which we have recently examined for the information of our readers. These improvements consist of the use of sharp rotary knives, which revolve in the center of the machine. In their movement, the edges of these knives pass close to the edges of stationary knives, and the seed being led into the space thus left, which may be readily adjusted, increased or lessened, the husk is cracked or cut and broken, and the kernel disengaged. The seed then falls into a separator, where the kernel is freed from the cottony husk, which is discharged one way, while the kernel goes in another direction. The husks, thus separated, serve admirably for bedding mules or for use in the cow-pens, or may be put at once into the compost heap. The hulled seed is fit for feed for horses, mules, cows, calves, sheep, pigs, and poultry, all of which thrive well on it when it is judiciously given. Being a

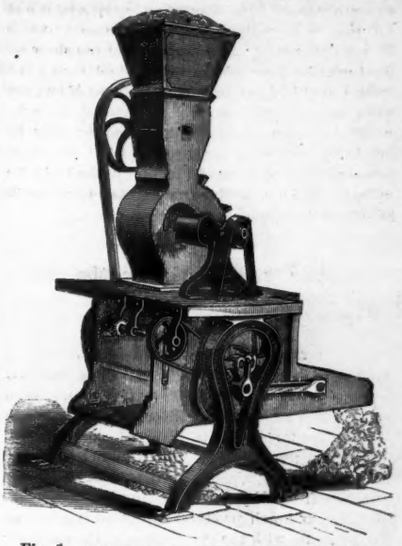


Fig. 1.—EXTERIOR OF COTTON SEED HULLER.

very rich food, only a small portion of it should be given to an animal at one time, and being the reverse of laxative in its effects, it is frequently found very useful in a medicinal way. By setting the knives more closely, the seed may be again passed through the machine and ground into meal; or the machine may be used for grinding corn, fine or coarse, as may be desired. It will grind the whole cob more finely than can be done in a burr-stone mill, and it has also been used for grinding dried roots and hulling coffee. A small machine for hand use is capable of grinding or hulling 5 bushels per hour, and a larger one, driven by horse-power, has three times this capacity. There have been few machines offered to southern farmers of late that may be turned to so useful a purpose as this.

MANURIAL VALUE OF FOOD.—A most important investigation has been begun by the Royal Agricultural Society of England, with reference to the actual manurial value of foods consumed under different conditions. Heretofore, the laboratory has been the field of investigation, now the field is to be the laboratory. This series of actual experiments will be watched very closely, and with the

Fig. 2.—SECTIONAL VIEW OF HULLER.

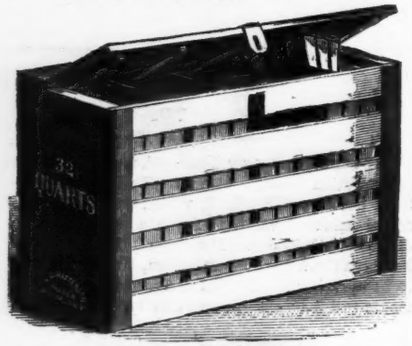
greatest interest, although many years must elapse before any decisive results are reached. It has been

difficult for farmers to believe what has been taught by Messrs. Lawes & Gilbert, viz., that the value of the manure made from a ton of clover hay, or wheat bran, may be more than the actual value of these foods in the market; if these experiments show by actual practice that it is so, we may look for a great improvement in our methods of farming, if farmers can be only brought to accept and practice upon it. Experiment Stations, in which theories may be brought to the test of practice, are what we want, and now one of the best farms in England will be converted into a great Experiment Station, to verify or disprove the teachings of the chemists.

Preparation and Work for the Berry Season.—Good Fruit Brings Good Prices.

In the course of the season we are in the way of seeing a great deal of produce; by taking different streets to and from the office and the boat upon which we make part of our journey to our home in the country, we can pass many of the principal commission houses, and find it interesting and instructive to examine the arrivals of fruit and vegetables from all parts of the country. The effect of seeing so much produce, is not to impress us very favorably with the good sense of the majority of producers. While the dealers send to their customers circulars enforcing the fact that their returns will depend upon the quality of their produce, and the condition in which it reaches the market, and the same has been reiterated by the *American Agriculturist* and other papers, the fact nevertheless remains, that much of the "stuff"—as the dealers properly call it—should never have left the place on which it was grown.

Every one who sends fruit to market, should understand that it is sold by its *appearance*. It is not the



A POPULAR BERRY CRATE.

name of the variety or its flavor that sells it, but it must look tempting to the buyer. He must consider two things: his packages, and his packing, and we will consider these with reference to strawberries, the first fruit, and one which is already being forwarded from southern localities. The customs of the markets in different cities vary considerably, and the present remarks apply to New York, where strawberries are never, as in some Western markets, sent in bulk or large drawers, and measured or weighed out to the buyer.

BASKETS AND CRATES, of whatever pattern, must have one thing well provided for—ventilation, and the greater the distance the fruit is to be sent, the more important this becomes. As to the shape of the basket, whether round or square, each has its advantages, and growers are about equally divided in practice. Fruit shows better in round baskets, while square ones pack better and carry safer. Recollect that *good* fruit will sell in either. Ventilation, freedom from any edges that may cut the berries, and full measure are to be sought for in any basket, and in the use of old baskets neatness must be regarded; fruit stains can not be avoided, but dust, adhering bits of bruised fruit, and other blemishes, may be. In selecting the crate, after the prime consideration—ventilation—size is of next importance; those who handle the crates are human, and will set a heavy one down hard; 60 pints and 36 quarts are as many as a crate should ever contain, and a less number is preferable. The crate made by N. D. Batterson, Buffalo, N. Y., has met with much acceptance by the growers in Western New York, and elsewhere, as combining strength, it being well secured at the corners, with lightness, and proper ventilation. The engraving shows its structure. When the crates are new they need not be painted, so far as appearance is concerned, but they should be painted when they become soiled.

MARKING is done by a stencil-plate, which is much preferable to a card tacked to the crate. Whatever the manner of marking, it should be done so distinctly that there will be never, at any time, any difficulty in ascertaining at once to whom the crate belongs, and to whom it is going.

PICKING.—No matter the excellence of the variety, no matter what pains may have been taken in cultivation to bring the fruit to perfection, the price it will bring in the market will depend largely upon the person who picks it. It is a common notion that anybody, even a child, can pick strawberries; while some children may be taught to pick well, the operation is one that requires "skilled labor," and the farther the fruit is to be sent, the more care is required. Secure good pickers, and exercise a constant supervision over them. A picking stand is a frame to hold 6 quarts or 12 pints, and has a handle to carry it by. A picker takes one or two of these; in a very hot day, or one with a strong drying wind, the fruit should be got under cover as soon as possible, and one is better than two. The picker usually makes two sorts, and has a spare basket besides, putting the largest and finest berries into one basket, and those of a second size in another; this, however, depends upon circumstances; if the fruit runs evenly, but one quality is made. The spare basket is for the over-ripe fruit, which should be removed from the vines before it decays, and by no means go with the rest. The picker of fine fruit must not hold it in the hand until that is full, but deposit each berry carefully. The stem of the fruit is taken between the thumb and fore-finger nails, and severed; the berry must never be pulled. The fruit in each basket must be of even quality from the bottom up, and the top well rounded up. All over ripe, misshapen, or otherwise imperfect berries, must go in a basket by themselves. The pickers should be followed to see that no stalks are broken, and no good fruit missed. The condition of ripeness must be considered by the grower, and this will depend upon the length of time the fruit is to be in transportation, and will vary from being light-colored on the under side, up to full color—but never, no matter how near the market, should the fruit be *soft*. Over-ripeness often causes much loss, the fruit falls down, and appears in bad order when opened. Recollect that a single over-ripe berry spoils the looks of the basket in which it is put, and the appearance of that basket hurts the sale of the crate.

AT THE PACKING SHED.—Have a shelter of some kind near at hand. As soon as the stand is filed, let it be taken there at once, out of the sun and wind. If assorted in picking, finish off by turning the hulls down, but never top off with the largest fruit. If not properly picked, each basket must be emptied, assorted, and refilled. Do not put the baskets into the crates until the fruit has cooled all it will. The fruit should be taken to the railroad or steamer in a spring wagon, and it will be well if a careful person can see to loading it upon the car or storing it on the boat.

The Fountain Pump or Sprinkler.

It is within but a comparatively few years that any attempts have been made to supersede the garden syringe by some form of hand-engine or pump. Within the last 20 years the substitutes for the syringe have been numerous; these have had for their object the throwing of a continuous stream—while the syringe must be alternately filled and discharged. If one could get together all the various contrivances for throwing water, some of which bear such high sounding names as "Hydropult," "Aquajet," etc., it would form a curious collection. It would be found that while these avoided the intermittent and slow action of the syringe, the weight of the substitutes was many times greater, and the multiplication of parts, addition of valves and air chambers, rendered them liable to get out of order, and the popularity of many was short-lived. Still, when invention gets on the track of a desired article, no matter how many the failures, the needed thing is sure to come at length. We do not see how a pump can be contrived that will take the place of the syringe any more effectively than does that known as the "Fountain Pump," invented and made by J. A. Whitman, Providence, R. I. To all outside appearance it is a piece of brass tube, with a supply hose at one end, and a nozzle at the other, or the nozzle may be replaced by a "rose," to convert it into a sprinkler. The interior structure is so simple that it is almost impossible to get it out of order; we have one which, after such usage as different men and boys are apt to give such an implement, is as good as ever. It is quite as light as the ordinary syringe, and for all greenhouse purposes will answer as a complete substitute, with the great advantage of giving a continuous stream. Its use is not confined to the greenhouse, but for out-door work is very effective; for applying any insect-killing liquids to plants of various kinds, we have found it especially handy. Aside from its value as a horticultural implement, the manufacturer states that there is a large demand for it for various domestic uses, as suggested in the engraving on page 180. Wherever a stream of water is to be applied with considerable force, as in cleaning side-walks and steps; washing carriages and windows, and all such uses it is convenient and effective. Another use should not be overlooked. A small stream, at the right spot, and at once, may prevent a destructive conflagration, and it is claimed for the "Fountain Pump" that experience has shown it to be a most valuable fire-extinguisher.

Talks on Farm Crops.—No. 3.

By the Author of "Walks and Talks on the Farm," "Harris on the Pig," etc.

"Are you going to use superphosphate on your corn this year?" asked the Deacon.

"No. If I use artificial manure at all—and I have used them more largely than any other farmer in town—it will be on crops which command a relatively higher price than corn."

"What crops may those happen to be?" said the Deacon, in rather a sarcastic tone. "I think a good crop of corn and stalks pays about as well, taking one year with another, as any crop we grow."

"I think this is true, but that is not what I alluded to. There are many other crops, in proportion to the amount of nitrogen and phosphoric acid which they contain, command a much higher price. For instance, a bushel of wheat contains but little more phosphoric acid than a bushel of corn; but it usually sells for fully double the money. And so of barley. A pound of good barley is usually worth much more than a pound of corn. If we raise crops, therefore, with purchased phosphates, their application to wheat and barley ought to pay better than when applied to corn. Still more is this true in regard to potatoes. A bushel of corn contains nearly three times as much phosphoric acid and five times as much nitrogen as a bushel of potatoes, while potatoes are usually worth almost as much as corn, and sometimes a good deal more."

I am aware that this is only one aspect of the case; and that the principle is not of general application. We greatly need a series of accurate experiments with chemical manures on Indian corn, as compared with wheat, barley, oats, potatoes, etc. Until we have such, we must work on in the dark, guided merely by common experience and observation. Indian corn is as much a puzzle to me as the effect of plaster as a manure. It is difficult to find any theory that will embrace all the facts.

Many years ago, when a boy in England, I was drilling in turnips. A shower of rain stopped me and the remainder of the field was not sown until the next day. The crop on the one part was far

better than on the other, though the preparation and manuring were otherwise precisely alike.

Indian corn is equally sensitive to incidental conditions. We sometimes get a great crop when we expect a poor one, and still more frequently we get a poor one, when we expect a good one. The Squire, last year, had a wonderfully fine piece of corn on an old pasture that the year previous was completely covered with thistles. There was nothing peculiar about the treatment. The land was carefully plowed in the fall, with a jointer-plow, harrowed thoroughly with a Randall Pulverizer, and the corn planted in hills 3½ feet apart. The corn came up well, grew well, and continued to grow. In July, I passed the field one day and could hardly believe that such a crop could be grown on such land. But there it was, a dark-green, luxuriant mass of vegetable growth, the admiration of all.

Such a crop is calculated to enforce the importance of the right mechanical condition of the soil and of planting in good season.

"I am glad to hear you say that," said the Deacon. "You would make a better farmer if you would get rid of your chemical nonsense."

"I am not so sure of that," said I, "but the corn crop is certainly well calculated to teach an agricultural chemist humility."

Of course corn cannot grow without food. But the main practical point is to get the soil dry, warm, fine, and mellow, with the requisite degree of moisture to cause a prompt germination of the seed. In corn growing a "good start is half the race."

Mr. Crozier's plan of raising corn on ridges with manure underneath, as turnips are grown in England, can never be generally adopted here. Our seasons are too short, and work is too pressing. In this section nine-tenths of our corn is planted on sod land on which the plan cannot be adopted.

Last year the Deacon planted on sod, and I planted in the adjoining field on stubble, the land having been in corn the previous year. The Deacon beat me very decidedly, though I had a fair crop.

"Corn almost always does better," said the Deacon, "on sod land than on stubble land, and I do not believe in your plan of raising corn after corn."

"Neither do I, as a rule, but the land was foul, and I wanted to cultivate it two years in succession in hopes of getting rid of the weeds and making the land mellow. When I get the land down in clover and grass again, I hope to see the good effect of this two year's thorough cultivation."

I adopted a plan last year which worked even better than I expected. My land varies greatly.

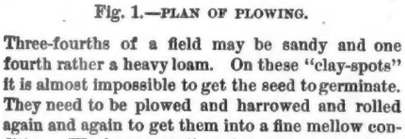


Fig. 1.—PLAN OF PLOWING.

Three-fourths of a field may be sandy and one fourth rather a heavy loam. On these "clay-spots" it is almost impossible to get the seed to germinate. They need to be plowed and harrowed and rolled again and again to get them into a fine mellow condition. We have not time to go over the whole field, and if we had, the extra work on the lighter portions of the field is entirely unnecessary, and so I adopted the following plan: We prepared the field for planting, and then marked it out in rows, 3½ feet apart. Then we took a plow with a good point on it, so that it would take hold of the hard soil, and put it in six or seven inches deep at *a*, on the left-hand side of the mark, and about seven inches from the mark, and threw up a good furrow as far as the clay-spots extended. When we came to the lighter parts of the field, that were already fine and mellow, we turned again at *B*, and threw the furrow back again into its place. In this way we plowed 14 or 15 inches of the land directly under where the corn was to be planted. Figure 1 may assist in giving an idea of the plan.

After the plow, the roller was passed along the furrows, and pressed them down; and, when necessary to crush all the lumps, we also ran the roller *across* the furrows. The land was thus left almost as flat as if it had not been thrown up. Mark out the rows again, if necessary; but as we drill in our corn with a grain-drill, this was not needed. The Deacon still sticks to his plan of planting in hills 3½ feet apart each way. Sometimes I do so also; but the temptation to put the crop in with a drill is so strong, that three years out of four I drill in the corn. It is quick work, and you can put in the seed as fast as the land is prepared; but with hills, you must get the whole field ready and marked one way, before you can begin to plant at all.

I have not fully made up my mind as to which is the better plan. If the land is rich and smooth, I think drilling will give fully as much sound corn, and at least one-quarter more stalks, and of better quality. But on rough land it is a decided advantage to be able to cultivate the land both ways.

"I know," said the Deacon, "that you will claim that it is no more work to keep the land clean, but at any rate you will admit that it is more work to *cut up* the drilled corn than corn in hills."

This is true, but I am in hopes that we shall soon cut up our corn with a self-raking and self-binding reaper, that will tie it in bundles which can be conveniently loaded on a wagon and drawn to a ten-horse power steam husking-machine, that will go round from farm to farm. But we may have to wait a few years longer for this.

A correspondent asks me to give my plan of raising mangel-wurzel. I have not time to do so now. The best plan for him to adopt, I think, is to plow under a good coat of rich, well-rotted manure. Or if he has not enough manure, sow say 400 lbs. of nitrate of soda and 200 lbs. of superphosphate per acre; or 500 lbs. of rectified Peruvian guano, containing 10 per cent. of ammonia. If he is anxious to raise a great crop, he may double the quantity.

If sod land, I would plow under the barn-yard manure, and sow the artificial manures on the surface and harrow them in very thoroughly. And do not forget to roll the land. This is very important. Then mark out the land in rows, 26 to 30 inches apart. Then with a dibble, make holes, from one to two inches deep, and 12 to 15 inches apart in the rows, and drop in two or three mangel-seeds, and go over the piece again with a roller. This is all. It is less trouble than you may suppose.

This plan saves seed; it is less work to thin out and hoe the crop; and you can soak all the seed in soft water for 24 or 36 hours before planting. This in itself is a great advantage, for if the ground is mellow, the plants will be up in a few days, and you can get the start of the weeds. When drilled in, you cannot soak the seeds, and if the land is dry, the seeds may not start for two or three weeks.

"If you soak the seeds, they may germinate, and then die for want of moisture," said the Deacon.

"True, but I would rather take this risk, as you can plant again, or what is still better, set out cabbage plants, as soon as the rain comes."

"I can indorse that idea," said the Deacon, "for you had a noble lot of cabbage last year that you set out among the mangels. But it is not always as easy to sell cabbage as it was this winter."

"We did not raise them to sell," I said, "but set them out for the ewes and lambs, or cows, in spring. They brought such a high price, however, in market, that I sold the best of them. In raising cabbage for stock, the mistake we have made is in planting the large varieties. Size has a wonderful attraction; but I have become thoroughly disgusted with the very name of Mammoth Cabbage and Giant Mangels. We want solid heads of cabbage, and firm, smooth mangels, that will keep until June. In other words, we want quality, rather than quantity. The farmer who is going to raise two or three acres of mangel-wurzel, should sow an ounce or more of some good variety of winter cabbage. He will then have plants to fill up vacancies, and if there are no vacancies, he can usually dispose of the plants, or set them out by themselves. If not wanted in market, the ewes and lambs, or cows, will be very grateful for them next spring.

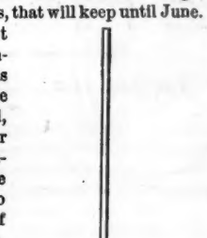


Fig. 2.—DIBBLE.

I used to make a dibble with five or six pegs in it, but I find that you can do the work easier and just as fast with one that has only three pegs in it. It can be made in a few minutes. Take a piece of pine scantling, 2x2, and 33 inches long. Bore a ¾-inch hole in the centre, and another hole on each side, 15 inches apart. Put a rake or hoe handle in the center hole, and a couple of pegs in the other holes, and let them project 2½ to 3 inches below. Sharpen to a rather blunt point, and it is ready.

As before said, the ground should be marked out in rows. You take the dibble in the right hand, or in both hands, and go along the row, striking the three pegs into the soil, and thus making holes along the row, 15 inches apart. This is my rule, but if you prefer 12 inches, I have no objection.

As soon as you can see a plant, strike the hoe boldly on each side. You are sure that there are no plants for a foot on each side. In drilling, I usually put on 8 lbs. of seed per acre. In dibbling, 2 to 3 lbs. is enough. The America-grown seed is much larger than the imported, and more pounds, or rather, more quarts are required per acre.

In drilling, this should be borne in mind. Better put on too much seed, than too little. There are two or three kernels in each seed. By cutting them with a sharp knife, you can see if the seed is good.

If the plants come up well, and the land is rich, you are almost certain of a good crop, provided you thin out to one plant in a place, and keep the land clear with the hoe and cultivator.

One word more. If you raise mangels at all, put in a good many. It does not pay to put in a few rods. You want enough to feed liberally. From the first of March to the middle or end of May I give my sheep and cows and pigs nearly all they will eat, but give them a plenty of other food as well.

Improvement in Harvesting Machinery.

The most surprising thing we have recently seen in the way of agricultural machinery, was a

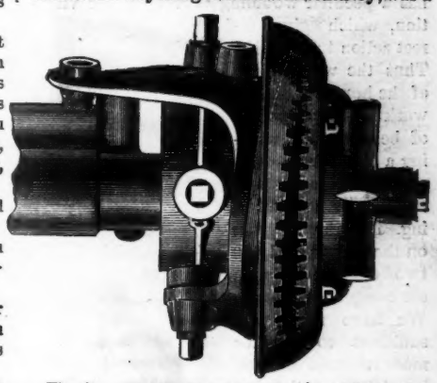


Fig. 1.—MECHANISM OF WHITELY'S MOWER.

mower shown at the Centennial Exhibition last year, working admirably without any visible gearing. Indeed, one might very well say that the machine was without gearing; for on close examination a single pair of cog-wheels only was found, snugly hidden and encased in a tight box. This machine was favorably referred to in our reports of the Exhibition made at the time, and a personal trial of it since then in the field, only confirmed our high opinion of it. The machine, of which a general view is given in the illustration on the next page, known as Whitely's Champion Haymaker, is peculiar in having adopted a most important and yet simple novelty in mechanics, by which the following useful effects are produced. The draft is remarkably light, because the absence of the usual gearing reduces the friction to a minimum. The work is so free from noise and clatter, that the machine, at work twenty feet away, is scarcely heard by an observer. Strength and durability are secured in

the highest degree, by the peculiar movement to be presently explained. It is claimed for this mower that the knife will work in any position, and may be adjusted while in operation to cut low or high; to take up lodged hay or grain; to pass over stumps, stones, or other obstructions, by raising either or both ends from one inch to a foot; or the bar may be lifted up as in fig. 2, to pass a tree, or for any other purpose. There is no pitman to become entangled with grass, or to jar or to waste power in noisy operation. We find that the peculiar movement referred to, and which may be used for other mowers and machines, works in a most satisfactory manner. The important novelty in this machine, and its chief value, consist in its motive parts. These are two small cog-wheels, or disks only, which are shown in figure 1. These are placed together, so that there are always eleven cogs in contact, giving extreme strength, and making the breaking of a cog impossible. Only one of these wheels rotates, the other, from its being hung on what is known as a gimbal point, has a peculiar wobbling movement, or vibration, which gives direct action to the knife. Thus the whole force of the horses is used to work the knife, instead of being used in wearing a number of cogs, and making a wasteful and annoying clattering. There are no gears on the wheels, and the two disks mentioned are completly enclosed. We have not space sufficient to describe more fully the interesting details of the machine, and only to say that the smallest of these are constructed on the same bases of strength, simplicity, and effectiveness, as the principal parts. One point should not be omitted, which is that one geared disk has 40 cogs, and the other 48, so that a great many revolutions occur before the same cogs come into contact with each other the second time. This has the effect of preventing such wear as would cause unevenness in working, even after many years. This machine has received many first premiums at agricultural fairs, and a medal and diploma at the Centennial. A more full description of this peculiar movement will be found in an illustrated pamphlet issued by the proprietors. This improvement is the property of Mr. Wm. N. Whitely, one of the manufacturers of the Champion Reapers and Mowers of the city of Springfield, Ohio.

USES OF THE FOUNTAIN PUMP.—(*See page* 178.)

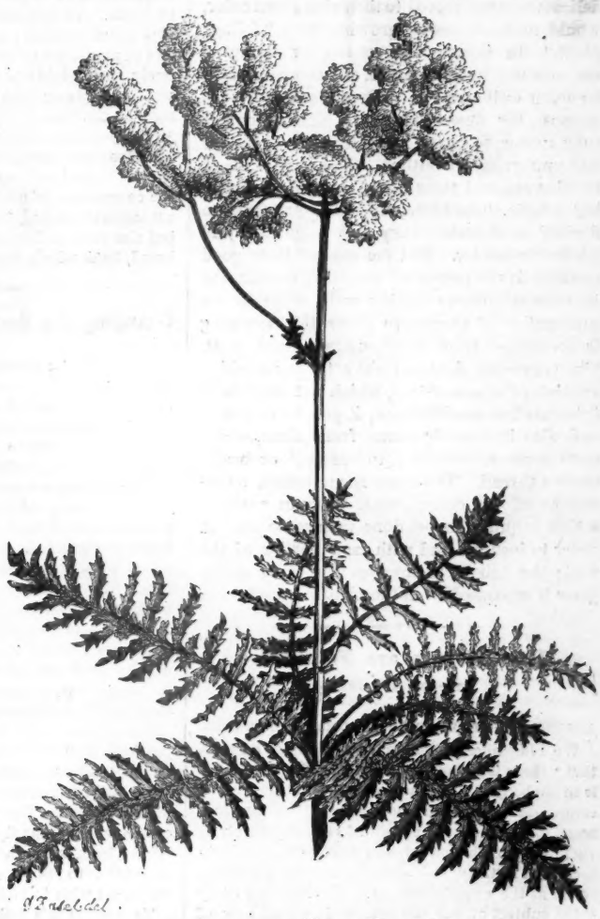
Fig. 2.—WHITELY'S IMPROVED CHAMPION MOWER.

A Cruel Flower.—The Bladder-Flower.

Every now and then an old plant turns up as new, as is the case with the Bladder-flower, which we had not seen for twenty-five years or more, but last year one or two florists offered it, and we now see that several have it in their catalogues. Firstly, as to its name; it is in the catalogues, and some books, as *Physianthus*, from the Greek words meaning *bladder* and *flower*, and as the plant has not, so far as we can learn, an English name, and as the majority will like it all the better if it has one, we translate the generic name. But here comes the trouble that botanists no longer call it *Physianthus*, because, before it received that name, some one else had given it another, and as the oldest published name must be followed, it is properly *Araujia*, which is the name by which it is called by the savages in its South American home. It is often a great bother to fit a plant with an English name, and we can not see why *Araujia* is not good enough, but as the majority think differently, we comply with their wishes when possible. The plant is a climber from Brazil, which has leaves and flowers of the shape shown in the engraving, the leaves being of a whitish-green or light sage color, and the flowers, which are hardly sufficiently bladder-like to warrant the name referred to, are white and fragrant. The fruit is as large as an orange, or larger, is quite curious and ornamental, and said to be made, while young, into sweet meats by the South Americans; the pod being very light and spongy, breaking open and showing the seeds, each of which has a tuft of beautiful silky down, like those of our Milkweeds (*Asclepias*), to the same family with which it belongs. This relationship is further shown by the copious milk-juice which the plant gives off when cut or wounded. It has long been in use as a climber, for covering the rafters of greenhouses; it is hardy in the warmer parts of England, and no doubt would be so in Virginia and southward; in the Northern States it proves a useful tender climber, to be set out for the summer, it being of rapid growth, and will cover a large space, if given a rich spot. No doubt, the roots could be preserved in the cellar, though we have not tried it. When the plant grows in the open air, the flowers will be found with numerous insects—butterflies and moths—fastened to them, often

a half dozen or more to a single flower. Each insect will be found securely fastened by its proboscis or trunk, in such a manner, that by all its exertions it can not free itself. The poor things beat themselves against the flower, dusting it with the scales from their wings, and against one another, until from starvation or exhaustion they die a miserable death. We have given accounts of plants which catch insects, and feed upon them, and can see that this seeming cruelty is to a useful end—at least to the plant. Then there are other plants, which make use of insects to fertilize them, as Dr. Gray has clearly and abundantly shown. In this operation both plant and insect are benefited, though sometimes in doing this an insect fares badly; as the honey-bee, which, in fertilizing the Milkweed, gets its legs so loaded with the mass of pollen, that if it gets to the hive, it is unable to climb up the comb, and dies; yet even here the intention is good, though the bee overdoes his part of the work. But in our *Arauja* we can find no such excuse. The flower is not fertilized by these insects, nor does the plant consume them. The contrivance for catching the moths and butterflies is as effective as if it had been designed for the special purpose, and to all appearance the plant is guilty of an act of unmitigated cruelty—catching and killing—no not even that—starving to death, inoffensive insects, just for the fun of it. Certainly appearances are very much against the plant, and *Arauja*, being a "barbarous name," is properly applied. When the plant was in flower, we made a sketch of the mechanism of its trap, but it is unfortunately mislaid. Suffice it to say that the anthers are so placed, that their spreading cells form a series of notches WW in a ring around the pistil. The insect, in putting its proboscis down for the honey, must pass it into one of these notches, and in attempting to withdraw it, the end is sure to be caught in a notch—boot-jack fashion, as it were—and the more the insect pulls, the tighter its trunk is drawn towards the point of the notch. Whether the insect is unable to back down its flexible trunk, the only way it can get release, or does not think to do it, we can not say, but the fact that it doesn't is very evident. As it is contrary to the natural order of things, for an insect or a plant to do an act, without subserving some good end, we do not think this to be an exception. An examination of the flower shows it to be so constructed that it must be fertilized by some insect, evidently by one with a proboscis of a different kind from that of our moths and butterflies. No doubt in its native home the particular insect is abundant, and all goes on well. Human intervention disarranges the whole affair, and we set out the plant where our insects, unused to this style of flower, are attracted by its abundant honey, and are led to a miserable death, while the plant acquires a reputation for a cruelty, which it can not avoid. An English writer, a few years ago, wrote of the flower as "diabolical," for trapping insects just "for the fun of covering itself with borrowed plumage." There is one compensation for this evil; a French writer has suggested that the plant may be turned to excellent account by the entomologist, by making it do the "bug-catching;" this is a capital idea, which we commend to our entomological friends, for to judge by the way our plant (sent by Peter Henderson) behaved last summer, we are sure that it would prove a most efficient trap for both day and night flying insects; the flowers held the largest sphinxes, or humming-bird moths, as well as those so small, that their proboscis barely reached the bottom of the flower.

A CRUEL FLOWER.—(*Arauja albens.*)



THE DROPWORT.—(*Spiræa filipendula.*)

The Dropwort.—(*Spiræa filipendula.*)

The genus *Spiræa* is one of the few which furnish to our gardens both woody and herbaceous plants; indeed, the shrubby Spiræas are so common, that many persons are surprised to learn that the Dropwort, and some of its relatives, belong with them. The Dropwort is a native of Europe, where in its single form it is a common plant, and though that is sometimes cultivated, it is far inferior to the double-flowered variety, the one of which we give an engraving, and which we consider one of the most useful of our border plants. The leaves form a dense rosette close to the ground, and are cut and toothed into very fine divisions. The engraving in this respect does not give a correct idea of the foliage, as in order to represent more distinctly the shape of the individual leaves, only a few are shown, while in reality they are so numerous as to form a thick mat, a foot or more across. The flower-stems arise from the center of this cluster, are nearly naked, in the single plant often two feet high, and in the double about a foot, and bear at the summit an open cluster of white flowers, which are sometimes tinged on the outside with pink. The double flowers are exceedingly double, the

small flowers being crowded with tiny petals, which give the mass a peculiarly light and "flocky" appearance. This plant is valuable for both its foliage and its flowers. The finely cut leaves have a fern-like appearance, and their delicate outline, joined to their rich green color, would make it worth growing as a "foliage plant." In Europe it is set out for edgings, a use to which its low stature, and compact, regular habit well adapt it. When planted for this purpose, the flower-stems are pinched out as they appear, to secure a greater vigor of foliage and uniformity of outline. The pure white of the flowers, and their tufted manner of growing, adapts them especially to bouquets and to florists' work, while they add brightness and life to the border. Not the least of their good qualities is the length of time they remain, the individual clusters lasting well, while by the production of successive stems, the flowering is continued from early summer until frost. The engraving does not show the root, which consists of coarse fibres, which are swollen at intervals into small tubers; it gets its common, and also its specific name, from these, which have some resemblance to "drops," or beads, upon a thread. The plant is multiplied by divisions of the clump, made early in autumn, which requires to be done with some care, in order to insure a bud with each portion of the root; the tubers themselves will very rarely grow if separated from the plant.

How Flowers are Fertilized.

BY PROF. ASA GRAY.

ARTICLE XII.—HOW CROSS-FERTILIZATION BENEFITS.

We remember a homely saying which declares that "there is as much difference in people as there is in anybody." The same is true of plants, and it comes out strongly in this matter of fertilization. Some plants show the benefit of crossing mainly in vigor of growth and greater hardiness, others in increased fertility, and some do not show it at all, so far as the experiments go. The Morning Glory—the subject of our last article—is a good case of the first kind; our garden *Eschscholtzia* is one of the second; and Tobacco appears to be a case of the third, but the experiments were not carried very far. Vegetable nature, like human nature, is full of complexities and apparent contradictions. To superficial observers and theory-makers, who run off in haste upon one line of facts, all appears to be simple enough; but the simplicity is generally subjective. Some very good observers soon get entangled and flounder helplessly among conflicting or discordant facts, and conclude that the whole thing is "something no fellow can find out." But any one who reads this book of Mr. Darwin's, on the effects of close and cross-fertilization, will see that he is a wary and patient investigator, who is neither carried away by his own theories, nor hopelessly arrested by unexpected complications. Out of his thousand and more crosses, and equally large number of close-fertilizations for comparison, certain results come out pretty clearly.

First, That crosses between different flowers of the same plant are not sensibly beneficial.

Second, That crosses between different individuals of the same stock, (say from seeds of the same plant), are more or less beneficial; but that the benefit does not go on accumulating in successive generations, or may disappear in the course of three or four generations.

Third, That crosses between plants which have been raised at a distance from each other, and therefore under different circumstances, almost always result in a marked increase of vigor or fertility.

Fourth, That this is also true of the crossing of two slightly different varieties of the same species.

And the important conclusion is, that it is not the mere cross-fertilization that benefits, i. e., that the advantage does not follow from any mysterious virtue in the mere union of two distinct individuals, as such, but that it comes from the individuals and their progenitors having lived under somewhat different conditions and influences, so as to acquire certain differences in constitution. It is from the combination of differences that the new strength proceeds. This explains a curious but well known fact about hybrids: namely, that where two species of plants are so much alike that they hydridize freely, the hybrids are apt to make much stouter and larger plants than either parent. This is well seen in the two common species of Stramonium. So this seeming anomaly is only an extreme case of the advantage derivable from the union of differences. I need not say that all this coincides with the conclusions of cattle-breeders, who find it advantageous not only to cross breeds upon occasion, but also cross at times with individuals of the same breed, from widely separated flocks or herds.

Changing the Bearing Year of Orchards.

[To judge by the extent to which it has been copied, and the correspondence it has called out, our article in March last, with the title given above, was timely, and the responses indicate that people are beginning to give to their orchards that which has been their greatest lack—thought. The following is from a most careful observer,—ED.]

Bearing every other year in orchards is a habit so well established, that many very honestly doubt if it can be corrected. Of course, nothing but facts can help us to an intelligent decision of this question. A. J. Downing wrote many years ago in his work on Fruit Trees: "The bearing year of the apple, in common culture, only takes place every other year, owing to the excessive crops which it usually produces, by which they exhaust most of the organizable matter laid up by the tree, which then requires another year to recover, and collect a sufficient supply to form fruit-buds. When half the fruit is thinned out in a young state, leaving only a moderate crop, the apple, like other fruit trees, will bear, as it will also, if the soil is kept in high condition. The bearing year of an apple tree, or of a whole orchard, may be changed by picking off the fruit, when the trees first show good crops, allowing it to remain only in the alternate seasons, which we wish to make the bearing year."

To sustain his opinion that orchards may be made fruitful every year, he cites a letter from R. L. Pell, of Pelham Farm, on the Hudson, who changed the habit of his orchard of 2,000 Newtown Pippin trees, making it abundantly productive every year. This was done by pruning, manuring, and keeping the soil under cultivation. Some twenty years ago we visited the homestead of David Lyman, at Middlefield, Ct., in the odd year, and found the ground in his orchard well covered with apples. He informed us that he plowed the ground frequently, manured liberally, and raised paying crops of apples with as much regularity, as other crops upon the farm. Some twenty-five years ago we grafted the Cogswell Pearmain into an apple tree in a neighbor's garden. It came into bearing in a few years, and has given regular crops annually, with hardly a break since. The ground has had high garden cultivation, and the tree has had all the food it could use. In the orchard, this apple is a persistent bearer in alternate years. We came into possession of our present premises eight years ago, on which were thirty pear trees, about half of them in bearing condition. There are a dozen or more varieties of pears, and all the trees of sufficient maturity give regular crops, with the single exception of a Vicar of Winkfield, which is now well furnished with fruit-buds in the barren year, and promises to give up its bad habit. A. Young, one of the best fruit-growers in the Mystic Valley, started his apple and pear orchard twenty-five years ago. Among his apples are the Cogswell Pearmain, Baldwin, Roxbury Russet, and other varieties, maturing in the summer and fall. He takes good care of his trees, manures and cultivates, and has crops every year. The only difference is that between good crops and extra good crops. Isaac Denison is another good fruit-grower in the same district. He began his planting eighteen years ago, and has a very thrifty and productive orchard. Both apples and pears bear every year with him. All the facts with which we are acquainted lead to the conclusion, that high cultivation, persistently followed, will remedy the barrenness of fruit trees in the alternate years. Feed your trees regularly, and they will feed you. CONNECTICUT.

Some Valuable Native Forest Trees.

BY PROF. C. S. SARGENT, DIRECTOR OF THE ARNOLD ARBORETUM, OF HARVARD UNIVERSITY.

(*Concluded from last month.*)

Red or Norway Pine, (*Pinus resinosa.*)

This fine tree grows through the northern portions of the United States, from the Atlantic to beyond the Great Lakes, appearing at rare intervals as far south as the mountains of Pennsylvania, and extending northward to the shores of Hudson's Bay. Never forming extensive forests, and only appearing in isolated clumps of a few hundred trees, either growing singly, or mixed with the more common conifers of the north, the Red Pine is but little known as a timber tree in our markets, and its valuable qualities are hardly understood. Considerable quantities of Red Pine lumber reaches Great Britain every year from Canada, and there is an active trade in it, in the form of "shooks," between the sea-ports of the State of Maine and the West Indies; indeed for "shooks," (the technical name for boards shipped to the West Indies for making sugar boxes), it is preferred to all our northern woods. I have been unable to learn, however, that Red Pine lumber is known among dealers in our large Eastern Markets, and it is doubtful if it now ever reaches them. Laslett, a recent English writer on timber, speaking of Red Pine, as it appears in the English Markets, says: "The wood is white, tinged with yellow, or straw color; it is tough, elastic, moderately strong, and possesses a clean, fine grain, which works up well, bearing upon the surface a smooth, silky lustre. It is not apt to shrink, split, or warp much in seasoning, and technically speaking, it stands well, which renders it a choice and very valuable wood for all kinds of construction, while in the domestic arts there need not be any limit to its application. The Red Pine is very solid about the pith, or centre of the log, and has but little albumen or sap wood. There is, therefore, only a small amount of loss in its conversion, even if reduced to planks and boards; while it can further be worked with great advantage in ship-building, for dock purposes, for cabin, and for other fitments."

As compared with White Pine, Red Pine is heavier, much stronger and stiffer, and from the greater amount of resinous matter which it contains, more durable, although less easily worked, and less suited for interior finish, or fancy work. The great hardiness, and rapidity of growth of the Red Pine, render this tree especially suitable for forest culture on poor soils, in the extreme northern portions of the United States, and in Northern Europe, where it alone of the North American pines promises to be of economic value as a forest crop.

As an ornamental tree, the Red Pine takes a high rank. In its young state it is the most elegant of the two-leaved Pines, and this elegance it owes to its graceful habit, and long, dark green foliage. It is certainly a more beautiful tree, than its nearest botanical allies, the Austrian and Corsican Pines, which it generally resembles; nor have I noticed, as yet, any liability in it to the attacks of a borer which threatens the extermination of the Austrian Pine in this part of the country, at least. For windbreaks, and shelter plantations, in the Northern States, the Red Pine will be as hardy and valuable as the Scotch Pine of Northern Europe; and the beauty of such plantations will be considerably increased by mixing together these two species, and thus contrasting the dark green foliage of the American tree with the peculiar light, blue-green foliage of its Old World relative.

The Yellow and the Red Pines are rarely met with in cultivation. A few of the largest collections of conifers in the United States and Europe

possess, here and there, a single specimen, but young plants, strange as it may appear, cannot at this time be procured with any certainty in any American or European nursery. For this reason I have dwelt somewhat at length on the merits of these trees, in the hope that some of our nurserymen will take them up, and make them common and cheap enough for forest and ornamental planting.

Blue Glass in Horticulture.

In 1871, Gen. A. J. Pleasanton, of Philadelphia, published an account of his experiments with blue-glass, claiming that vines in a grapery partially glazed with glass of this color, were vastly more vigorous in growth and productive of fruit, than those under colorless glass. He also claimed that pigs, under violet glass, made a much more rapid growth that those in an ordinary pen, while a sickly bull-calf, placed in a blue-glass pen, not only recovered at once, but in 50 days developed in a manner described by its owner as "marvelous." These revelations do not appear to have created any general interest at the time, but last year (1876) a new edition of the work appeared, giving accounts of numerous alleged cures of disease in human patients, and other wonderful results on both plant and animal life, effected by blue light. Soon after this publication there was an excitement concerning blue glass; and so many were disposed to make a trial of it, that the stock became rapidly taken up, while the price of the article was duly advanced. The newspapers helped the excitement by frequent articles, either taking a serious view of the matter, or turning it into ridicule. We received Gen. Pleasanton's work several months ago, though we can not say that we have read it, as it is well nigh impossible for any one having a knowledge of the elementary laws of physics, to wade through it. The remarkable views presented as to light, electricity, magnetism, and matter in general, and the ease with which the most abstruce questions are disposed of by assertion, make the work a curiosity. The medical relations of blue light, we regarded as one of those singular delusions that periodically possess the public mind in relation to curative means, which would have its run, and if it did not lead to the neglect of proper treatment, might prove harmless. The influence of blue glass upon plant growth, being more in our line, we examined the claims made for it, and finding these in such direct opposition to the facts established by men of science, we did not think it worth while to present the matter to our readers. Recently, however, letters of inquiry have come, and as we learned that several persons were taking out the plain lights from their greenhouses, and replacing them by blue ones, we found it necessary to say something on the subject. As we were about to write on blue glass, there came most opportunely to hand an article from Peter Henderson, Esq., which being, as his articles usually are, the result of experience, will carry more weight with our readers than a presentation of the matter in any other form.

What Peter Henderson knows about the Effect of Blue Light on Plants.

Five years ago, (though utterly skeptical as to its value,) I, at the urgent solicitation of a friend, used a *blue* transparent wash on the glass of one of my greenhouses, thus changing the glass practically into blue; on the glass of another house, of similar size, I used whitewash. Both greenhouses were filled with plants of a similar character. In a few weeks we found that the plants in the house under the blue glass were "drawing," or spindling up, more than under the white, and on examination of a thermometer, placed in each house, it was found that, during the first two weeks in June, the average temperature, under the blue glass, was 90°, while under the white it was 80°. This was just such a result as might have been expected, the darkened glass *absorbed* the sun's rays, and the heated glass gave off its heat to the interior of the house, while the whitened glass *reflected* them, that was all. The temperature was simply increased under the blue glass, and to the great detriment of the plants, for all cultivators know that in our hot summer months, the difficulty we have to contend against is too high a temperature. If Gen. Pleasanton started to force his grapery in midwinter, his blue glass would be apparently beneficial—not because it was *blue*, but because it would assist him in getting a higher temperature, which would, *at that season*, be desirable; or, for the same reason, his pigs might feel somewhat more comfortable and fatten more quickly. But were he to carry on the culture of either under the blue glass into midsummer, both pigs and grapes would be likely to remonstrate. Upwards of 30 years ago, it was claimed that seeds would germinate, and cuttings root, quicker under dark-colored than under light-colored glass; this is no doubt true, and from the same cause—an increased temperature under the dark glass, but all who have had experience in such matters, well know that this "forcing" process is at the health of the subjects so treated, unless indeed they are plants indigenous to tropical countries, to which a high temperature is natural. To claim that blue glass, or any other colored glass, has any properties capable of affecting health, in other manner than what is due to an increased temperature, produced by any other means is undoubtedly false.

Mr. Henderson no doubt assigns the proper reasons for whatever seemingly favorable influence blue glass may have upon the plants growing beneath it. That there is any peculiar power in the blue ray to accelerate plant growth, which our readers are well aware depends primarily upon the decomposition of carbonic acid, liberating the oxygen and the assimilation of the carbon, is disproved by the results obtained by various careful experimenters. Indeed, the rays of the blue end of the spectrum are much less favorable to the decomposition of carbonic acid by plants, than yellow rays, and either alone greatly inferior to all the rays together—or white light. The experiments of Pfeffer (Sachs's *Lehrbuch der Botanik*, 1875), show that the amount of decomposition under white light being 100, the red-orange rays had a decomposing power equal to 32.1; the yellow, 46.1; green, 15.0, while the blue and violet rays are only 7.6. We were quite amused with the strong common sense view of a friend, who, in speaking of the subject, remarked: "if blue light were best for plant growth, the Creator would have provided it in the beginning." Should any of our readers desire to give their plants blue light instead of white, we would warn them that its application is patented! Blue rays are an essential part of white light, and some court may yet decide that the use of the greater involves the less, and we are all infringing upon the patent. At last accounts white light is not yet covered by a patent, but one can not tell what may happen.

CAULIFLOWERS.—In our climate early cauliflowers oftener fail than succeed. Allowing the seed to be of a good strain, many skillful cultivators find themselves unable to produce anything like a fair return for their labor from early varieties, while they have excellent results with the late crop. This is because our climate is very unfavorable to the one, and well suited to the other. At the time late cauliflowers are perfecting, the heat of the sun is daily becoming less, there are frequent fogs, and the nights are cool with heavy dews. All these conditions, which so suit this plant, are exactly reversed when the spring crop is coming on; then the temperature of both day and night is increasing, and just before the plants have reached their full size, and are ready to head, the weather is so hot that growth is checked altogether, and the plants come to a stand-still. In order to succeed, the early plants should have their growth pushed as rapidly as possible; abundant manure, of course, they need, and they should be protected on chilly nights. If hand-lights can not be afforded, then some screen or shelter, to be put over at night, to prevent any check by chilling, should be provided. Then if there can be some easy methods of watering abundantly when dry weather comes on, all will have been done that our climate and conditions will allow, and fair success may be looked for.

THE HOUSEHOLD.

☞ *For other Household Items see "Basket" pages.*

Home Topics.

BY FAITH ROCHESTER.

Floor Cleaning.

"The melancholy days have come,"—not those Bryant sings so sweetly about, but sad days for the housekeeper. When this screed of mine appears in the clean print of the *American Agriculturist*, it will be settled weather, and clean carpets will have been tacked down in the sitting-room, and grassy and hard-beaten paths will yield little mud for the housekeeper to sweep out or scrub away. But while I write, the thaws of March are upon us. To scrub or not to scrub, that is the question. For, three hours after the most careful cleaning, it may be that the difference between the present condition of your floor, and its appearance an hour before mopping, is scarcely perceptible to the naked eye.

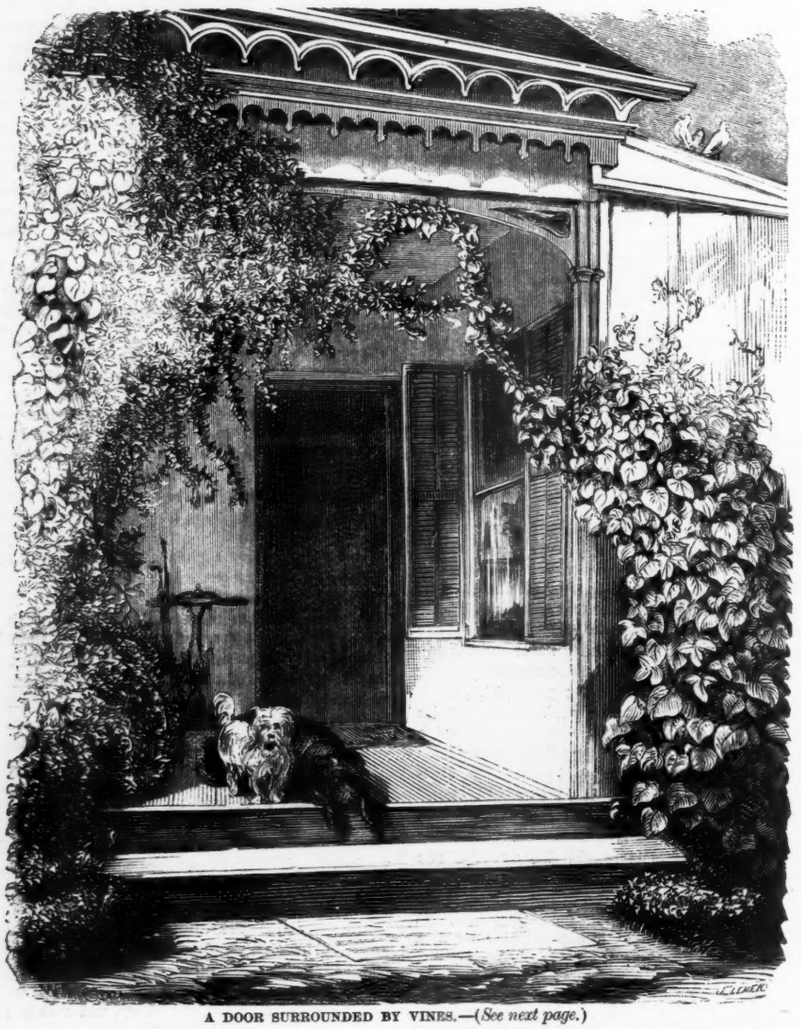
In such a state of things I really do not think it pays the busy housekeeper to seriously "scrub" her floor. I got an idea from my mother on that point years ago. It was rainy weather, and children were running out of and into her kitchen, and mud was unavoidably brought in by different members of the family. When I saw her get her mop and pail, I exclaimed: "O! it won't pay to clean this room to-day, if it is Saturday. By to-morrow it will look as bad as it does now."—"I shan't scrub it, but only wash off the top-dust," said mother. After the work was done, I saw the utility of it, we were all able to breathe so much freer in a room, when the "top-dust" was washed away. Many a time since then have I been expostulated with for washing the floor, when it was "no sort of use—it would get muddied over again right away." Men who make such remonstrances scarcely appreciate the situation. They spend most of their time in the open air, and when they come in and sit down, they have no care of their skirts, as women have, no instinctive dread of seeing anything that must be added to the weekly washing, drop upon a dusty floor, and when the dust is stirred up and distributed through every part of the room by the broom, these kind-hearted men, who hate to see us do needless labor by frequent floor-cleaning, are usually out of the house. We soon learn by experience that dust on the floors means hard work at the wash-tub. A dusty carpet does not make work in the same way, for the dust sinks into and through the carpet, so that a clean cloth, dropped upon it, takes up little dust. But when it comes to the sweeping or dust-distributing, the unclean carpet is an unmistakable nuisance, and all day long, if there is any movement about the room, the dust in and under the carpet is stirred up, and makes the air more or less unfit to breathe.

How to Wash a Wood-Floor.

"Top-dust" can be washed off without great labor. Have the water only moderately warm, especially when the floor is of soft wood, because hot water sinks in so rapidly, and occupies so much more time in drying, than cool water upon wood. Drain the mop pretty well before putting it upon the floor, thus wetting the floor but little. The object is to wipe up the dust as thoroughly as possible, rinsing it off from the mop into the water, and changing the water for cleaner very often. If you put much water upon a very dusty floor, you have a big troublesome mud-puddle to sop up or rinse away. Experiment has convinced me that a floor of pine or basswood looks best after cleaning, if a small amount of water has been put on each portion of it. Use as much water as you please on the whole floor, the more the better, if you wash and wipe only a small portion at a time, and then throw out the dirty water, and begin the next division with clean water. The sooner a soft wood floor dries, the better it looks. I have seen women work very hard to scrub a pine or basswood floor white, and the result has been quite disappointing. They would put a great deal of water upon the floor, and then scrub with a broom

hard and long; after this would sweep all of the dirty water out, and rinse the floor with as many waters as they could afford. When at last the well-soaked floor was dry, it was undoubtedly clean, but it looked dark and somewhat weather-beaten, in consequence of remaining wet so long. It is a question of health with me, in winter, to have a floor dry as soon as possible. A little lye in the water has an excellent effect upon floors. It may be poured directly upon decided greasy spots, but the whole floor is whitened with very little hard rubbing, if a small amount of lye is mixed with the water. Too much makes the boards yellow. How much should be used depends upon its strength. Never put lye into the water with which you wash a painted floor, else you gradually but speedily remove the paint with each cleaning. If you let an inexperienced hired girl have her own way with a painted floor, she will probably use her boiling suds upon it, and soon remove nearly all of the best paint. Clean warm water is best for painted floors. If you have a nice hard-wood floor, be thankful, especially if it be of white ash, but never let its spotlessness become dearer to your heart than the family peace. You learn by experiment how much nicer one of these hard floors look, when washed with clean suds, than when washed with the boiling suds of Monday.

Let those who like get down upon their knees, and scrub their floors with brushes and floor-cloths—such work is not for me nor mine, and I consider it pitiful business for any one. I hear of long-handled scrubbing-brushes, and doubtless these are suitable for human beings in the work of floor cleaning. What I most want is a cheap and easy mop-wringer, for I dislike extremely to put my hands into the mopping water. Of such a wringer I have heard, but have had no experience of its merits.



A DOOR SURROUNDED BY VINES.—(*See next page.*)

Bathing: How often, and When.

Habit has something to do with our supposed necessities in regard to bathing. Some respectable persons never bathe the whole body except in warm weather. Others cannot be comfortable, cannot feel clean, without a daily bath. Those who have a daily bath usually take it on rising from bed in the morning. For this purpose, some use water of any temperature which the season may make most convenient, even taking icy water in winter, and bathing in a cold room. Some who have followed this practice for years, have become convinced that it has wrought much mischief, and that only great robustness of constitution ever enabled them to endure the tax upon their native vigor so long. Most physicians do not advise so frequent bathing, considering a weekly or semi-weekly bath sufficiently frequent for cleanliness. Something depends upon the season or climate, and much depends upon the manner of bathing and the previous condition of the bather. It is an established rule that no general bath should follow very closely upon a meal. The stomach should be allowed to monopolize the first consideration for at least an hour after filling it, during which time no great demand must be made upon brain, muscles, or skin. The stomach, when full, demands more than its usual portion of blood, so that the surface of the body is sometimes made chilly on account of a heavy or difficult meal. When cool water, or much friction, is applied to the skin, an immediate demand for blood is made at the surface of the body, and of course stomach and skin cannot both successfully make these demands at the same time. Sudden death has been known to result from a full bath immediately after eating. I can't help thinking that many little children have suffered from the carelessness or ignorance of their mothers, or nurses, in regard to this rule. I have known more than one mother to bathe and dress her little child immediately after its dinner, just because this time was most convenient. This rule, however, does not apply strictly to infants while fed wholly on milk. The stomach of a little babe holds but a very small quantity, and this being wholly fluid, does not require a very long period for its digestion. It does not seem necessary to wait more than half an hour after nursing a baby, before giving it its mild little bath, which, of course, is never given in a cold room. If you wait too long, baby sometimes gets very hungry and complains loudly before the dressing is all completed. Physicians sometimes recommend that baths be taken when the body is at its greatest point of vigor, or near noon, but however this may apply to sick persons in respect to their curative baths, it cannot well be obeyed by busy people in their weekly or semi-weekly baths for cleanliness. A housekeeper will usually take her bath on rising in the morning, or when she changes her clothes after the dinner work is done, or when she goes to bed. One should not bathe when much fatigued, but if not especially weary, a bath just before bed is a good thing—not a "tonic" or cold bath, but a good washing with comfortable water, rapidly given if the room is cool; but if possible the room should be warm.

Graham Bread.

This is an easy and a good way to provide loaves of graham bread. When making common white bread, set enough sponge at night to spare a little for a graham loaf next morning. For one common tin-loaf take a little more than a pint of the sponge, add a table-spoonful of sugar, and stir it thick with graham flour. Stir well with a spoon, but do not knead it or it may be too hard and dry. Turn it into the buttered pan, let it rise in a warm place, and bake it slowly for an hour or longer.

Of course several loaves may be made in this way, setting a fine flour sponge at night, and stirring graham flour into the whole. Most people will prefer this to loaves of undiluted graham bread. Unless you put in sugar or molasses, your graham bread made with yeast is not half so sweet as graham gems, especially if these are mixed with sweet milk, either new or skimmed. Many prefer to steam graham loaves for an hour, and finish by baking about 20 minutes—to prevent a hard crust.

Sour Milk and Soda.

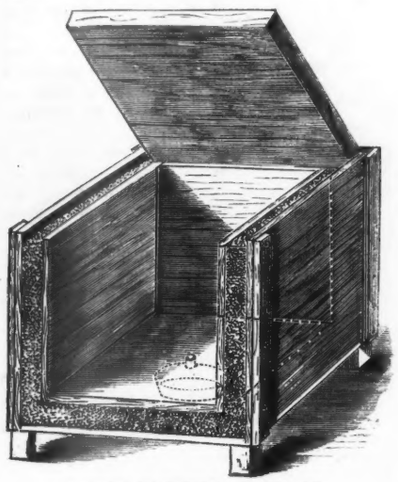
I presume I can say nothing under this head that has not been said before in these columns. But I perceive that there are experienced housekeepers who have yet to learn how to use soda with sour milk. A woman of double my experience told me, not long ago, that she had now got so that she could make sour milk buscuit that her folks would eat. Now she mashed the soda and mixed it with the flour, then stirred in the sour milk or butter-milk. Before this she "put the soda in a cup," but the buscuits were always streaked and spotted. This would not happen, I am sure, if the right quantity of soda was taken, and if the soda was carefully dissolved in water, either warm or cold, stirred quickly and thoroughly into the sour milk, and rapidly beaten up with the flour.

In giving directions to another, I think I should advise a thorough incorporation of the soda with the flour, after both soda and sour milk have been exactly measured. For then the effervescense (or foaming) would all take place in the dough, the gas would raise the flour, and the mass would surely be light. A careless cook will perhaps mix her sour milk and soda together, and while it is foaming and settling again to quiet, she is perhaps getting her flour and hunting up her rolling pin, and of course she doesn't "have good luck" with her biscuit. If she would get everything ready, even the buttered tins, and then measure out a level teaspoonful of soda for each teacupful of sour milk, or a rounding teaspoonful for each pint, then dissolve entirely the soda in a cup by itself, and stirring it quickly into her sour milk or butter-milk, (sour of course), pour the whole into the flour before the foaming fairly begins, and work it together quickly—there would be no streaks and no heaviness. But the best thing to do with baking soda,

is to avoid its use as far as possible, for accurate measurement is impossible so long as there are varying degrees of sourness in milk, and different sized spoons and cups: and good things, and plenty of them, can be made without any soda.

A Home-Made Refrigerator.

In some cases it is not convenient to procure any of the very excellent refrigerators now made for



SECTION OF HOME-MADE ICE-BOX.

sale. Then a home-made one may serve a useful purpose. The materials for this, as shown in the annexed illustration, are simply two packing boxes, one of which is smaller than the other, a quantity of powdered charcoal, and a few square feet of hair-felt, such as is used for covering boilers as a non-conductor of heat, or of common oil-cloth. The engraving shows the boxes with the front parts taken away, so that the manner of putting them together may be seen. A few inches (not less than four) in depth of the powdered charcoal is laid on the bottom of the outer box, which should be lined with the felt. Then the inner box, covered on the outside with felt, is placed in the outer box. The space around it is packed tightly with the charcoal up to the top. A strip of tin is nailed so as to cover the charcoal between the boxes. The inner box should be lined with sheet zinc or galvanized iron. A hole is bored through the bottom, and a short piece of lead-pipe is fixed to carry off the water from the melted ice. The covers of the boxes are fitted so as to have an air space between them, and felt is tacked on to these to help keep out the heat. Common oil-cloth will answer in place of the felt, if that can not be procured. When in use, the ice is placed upon a small wooden rack upon short legs, which raise it an inch or more above the bottom of the box. The ice may be wrapped in a piece of blanket, which will make it last much longer than without it. If needed some rack shelves may be fitted around the box, upon which to place whatever is to be kept cool. The box is set upon four short legs, or blocks, and a pan is kept beneath it to receive the waste water.

Vines at the Door.

If the house-mother (to borrow a most convenient word from the Germans) looks after no other portion of the gardening, she is quite sure to take an interest in the vines, which cluster so closely around the door and windows, that they seem a part of the house rather than of the garden. Here is a common ground on which all can meet—the decoration of the house, for there is no work of the architect, however costly, but seems to need the final finish of vines, and no house, however poor in its exterior, but may be made to look home-like by the use of climbers. In our climate every house should have a veranda of some sort, even if but a mere porch, to shelter the door, and whether it be an extended veranda or narrow "stoop," there is a place for vines. The utility of vines, whether on the score of shade, or that of mere ornament, needs no showing, as all will admit it, and it becomes merely a question of ways and means—what to plant, and how to get it. In the first place let us say that if there is neither veranda or porch, and most log houses, and some of more pretentious have neither, one need not be without vines. A trellis of poles of some kind can be arranged to support the vines, and if it can be made of cedar and permanent, all the better, but if this can not be commanded, draw upon the stock of bean-poles, or get poles by some means that will answer for a season. Given poles, a few nails, some wire and string, and assuming the rather improbable case that she can get no help, the woman can have the door shaded if she will. As to the trellis but a few suggestions need be given. No matter if it looks rude at first, the vines will charitably cover any sins of construction. Recollect that vines are heavy and autumn winds powerful, so regard strength rather than beauty. If there are two doors and but one trellis, put it at the one where it will be the most use and comfort. Of vines we have both annual and perennial. Annuals, raised each year from seed, are the least satisfactory, but are sometimes the only ones available. The number of those which grow sufficiently tall is small. One of the best is a native, the Wild Balsam-Apple, or Wild Cucumber, (*Echinocystis*), which was figured in April of last year, and about which Faith Rochester wrote so enthusiastically in Nov., 1875. But unfortunately this is not to be had at the seed-stores, and unless you happen to know a friend who has some seeds, this is out of the question. Next comes the Morning-Glory, old, but good; the flowers are short-lived, but some of the finer kinds are sufficiently beautiful to offset this defect. A paper of seeds of the best can be had for 10c. The Hyacinth Bean and Scarlet Runner, do not make so dense a covering, but are better than no vines. When we come to perennial vines, the list is larger. Among those that may usually be had without any expense, the common Hop is one of the most available. It grows wild in many places, and is to be found in cultivation all over the country. The common Virgin's Bower, (*Clematis Virginiana*), the Large or Hedge Bindweed, (*Calystegia*), often called Wild Morning-Glory, the climbing Bittersweet, or Wax-Work, (*Celastrus*), and Virginia Creeper, (*Ampelopsis*), are common, while one or more Honeysuckles are not rare. Either of these wild plants, to be had by only the trouble of searching for and taking up, will make a dense shade, and when the plants are well established, an abundant one. The nearest nursery will supply at 25 to 50 cents each, according to size, various fragrant Huneysuckles, Trumpet Creeper, Climbing Roses, and others. For a little more outlay the fragrant Akebia, the showy large-flowered varieties of Clematis, the Dutchman's Pipe, and others may be had. We have not mentioned the grape-vine, some varieties of which, such as the Clinton, make a capital shade, but the temptation of the green fruit to children, make other plants more desirable. Neither in the cost of vines, nor that of a support for them to grow upon, need there be any good reason why any one who really wishes it, should not add the comfort and beauty of a vine to their dwelling. While those who can afford a moderate outlay, will find that there is an adundance of pleasing climbers which, in the ornamental character of their foliage, and fragrance and beauty of flowers, will give ample returns for the investment. We have often thought, when passing a new house, it is a pity that the cost of some of the scroll and other "ginger-bread work" on the verandas, could not have been invested in vines. It is well to bear in mind that galvanized wire—about No. 14—will prove a most useful aid in carrying vines wherever they are wanted. It is desirable that vines should not run directly upon the wooden pillars of a veranda, wires may be stretched vertically about two inches from them, to which the shoots may be trained as they grow. The engraving opposite (page 184) represents the doorway of the summer residence of a friend, who prefers giving the vines some liberty to close training.

BOYS & GIRLS' COLUMNS.

The Doctor's Correspondence.

What is the matter with the eyes of some of you? We put Aunt Sue's address at the end of the puzzle box for a long time, but finding that some did not see it, we put a row of ¶¶¶ over it, to point it out more plainly. In spite of this, some will not see it. I have before me a postal card, asking for the address of both Aunt Sue and the Doctor—now I do not so much wonder that this boy didn't see it, as he forgot to sign his own name, but others ask the same thing. As grown people overlook things also, we perhaps should not think it strange in our youngsters. You will find Aunt Sue's address at the end of the Puzzle Box. The Doctor's is at the office of the *American Agriculturist*. Another thing youngsters should understand, Aunt Sue and myself live some 15 miles apart, we do not see one another oftener than once or twice a year, and if you, as some do, write to one to "tell the other" so and so, we can not do it without writing a letter, which you may as well do yourselves.... Master "T. M. C." wrote to Aunt Sue that I had not told all about the

Fig. 1.—ANT-LION—THE WINGED INSECT IN THE AIR—THE TRAP, AND THE LARVA ON THE GROUND.

BALTIMORE ORIOLE,

as I said nothing about the eggs, which he says are "four or five, flesh-colored, with a blueish tint, and marked with obscure lines of lavender, over which are irregular

scratches and lines of brown and black, as if done with a pen"....Here comes Master "Harry T. W.," who wishes me to tell him

ALL ABOUT ANT-LIONS,

and where he can find them. I have seen Ant-lions, Master Harry, but I really know very little about them. When I was a youngster, I lived not very far from the sea; we children were sometimes taken to the beach for a holiday, and I can recollect seeing the pits of the Ant-lions in the fine dry sand on the beach, so far back, that the tide would not reach them. I was too young to *study* them, and, as I do not find that the books on American insects have much to say about Ant-lions, give you on page 185 an engraving from a French work, which will show you what to look for. Ant-lions are plenty in Southern Europe and other warm countries, including our Southern States; though ours are not precisely the same as the others, they have similar habits. Some of ours are found, though not frequently, as far north as Massachusetts. To understand about the Ant-lion, you must know that it passes a part of its life as a larva or grub, and then changes to the perfect or winged insect, just as a butterfly makes its growth as a caterpillar, (the larva,) and then becomes a beautiful winged insect. The perfect Ant-lions have four long and delicate wings, and in their general appearance (as shown in the picture) are much like the Dragon-flies, also called Mosquito-hawks and "Darning-needles"—which, I suppose, you know very well. Its larva is not much like a caterpillar, but is an oval, bug-looking fellow, about half an inch long, and of a grayish, sandy color. One of these is shown on the ground in the engraving; the most striking thing about it is its pair of long and powerful jaws, or pincers, with which it can hold other insects, while it feeds upon their juices—provided it can catch them. But the Ant-lion is very slow on its small weak legs, and would have but little chance to use its nippers if it had to chase its food. What it lacks in speed, it makes up in strength and cunning. It selects a place in the loose sand, and soon wriggles out a pit, a funnel-like hollow, and hides itself at the bottom; being covered with sand, all but its head—it waits. When another insect comes along, which is very likely to be an ant, as they are very curious, and reaching the edge of the pit, looks in to see what is there, the loose sand gives way under its weight, and down the poor thing goes to the bottom, and into the jaws of the Ant-lion, which sucks it dry, throws its skin, by a jerk, far beyond the pit, and sets itself as a part of the trap again. When the insect is large, and likely to get away, the Ant-lion does not tackle it at first, but throws such a shower of sand that its prey is disabled. The Ant-lion lives in this way for two years, and when it has made its growth, it spins a cocoon and goes to rest, as a chrysalis, for a few weeks, and then comes out as the winged insect, which will lay eggs to produce more Ant-lions. You must not think that the Ant-lion has it all its own way; sometimes a big insect-eating beetle calls in, when it is not the Ant-lion that makes the meal—but the other. I hope you may find some Ant-lions in New Jersey, and tell us about them. You will only find their traps where the sand is fine, dry, and loose; such places are found along the margins of streams and ponds, and on the sea-shore....The father of one of our boys writes me that the youngster has

A KALEIDOSCOPE,

and while he gets much amusement from it, the father thinks that he will enjoy it all the more if I will tell him all about it. It is very difficult to tell *all* about it in such terms as the young man will understand, but I can give him some idea of it. The instrument was invented early in the last century, and was called Kaleidoscope from three Greek words, meaning to *see beautiful forms*. It

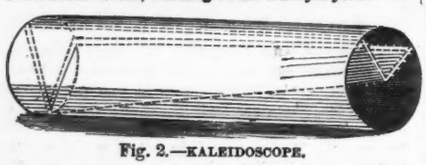


Fig. 2.—KALEIDOSCOPE.

was not scientifically studied until early in the present century. It is made of two mirrors placed in a V shape in a tube, as shown in the diagram, figure 2. These mirrors are of glass, painted black on the back, and joined together at one edge by a strip of cloth glued to them. If the mirrors are rightly placed, any small object placed at one end, and looked at from the other end, will be multiplied several times. The mirrors are placed in the tube, which has at one end a hole to look through. They are a little shorter than the tube, and at the opposite end from the eye-hole, a circular piece of glass is placed against the ends of the mirrors, and over this a cap, usually having a piece of ground glass, a small space —¼ or ½ an inch being left between the two glasses. In this space are put bits of colored glass, glass-beads, bits of straight and twisted wire and other things; these are all loose, and move freely, so that they can change their places every time the tube is turned. Whatever is in the space between the two mirrors will be reflected 10 to 20 times. Thus a straight piece of wire will look like a many-sided figure; one bead will appear as many beads, and the most irregular things, being multiplied or repeated, will appear in regular figures of great beauty. The only nice point is fixing upon how far apart the mirrors shall be, or, the older youngsters will understand it if I say the angle they form. They must form an angle which, when multiplied, will make 360. Thus if the glasses are at an angle of 36°, the objects will be multiplied 10 times, (36×10=360). If the angle is 18°, they will be repeated 20 times, (18×20=360), and so on for other angles. How to measure the angles can not be explained here, but unless they are exact, the figures will not be regular. Did you ever try to make a

PIANO KALEIDOSCOPE?

It is a very pretty amusement, and several can enjoy it at the same time. You use the parts of a piano-cover, which is usually highly polished, for a mirror. The part of the cover which comes down in front, answering for one mirror, and that to which it is hinged for the other. You prop the movable part of the cover with books, or in some other way, so that it will form one of the angles I have mentioned. You can hit it near enough after a trial or two. You then cover the open space with the piano-cover, or shawls, or any thing else that will shut out the light from between your two mirrors. At one end, the show end, you need a bright lamp, and then, instead of glass and beads, you will use any bright ribbons, strong-colored fabrics of any kind, such as tidies, neckties, etc., and various shining silver, or brass, or glass articles. One person holds these things close to the show end, but so that the light will fall upon them in full force, while the spectator (or several of them) looks in at the other end. The articles should be moved and turned slowly, to cause the figures to change. A little practice will teach you to manage a very pretty exhibition.

VEGETABLE IVORY.

Otto E., N. J., has read something about Vegetable Ivory; he thought that all Ivory was from elephants, and wishes to know about it. True Ivory is the tusk of the

Fig. 3.—IVORY NUT.

elephant, but other hard, and close-grained kinds of bone, such as whale's teeth and walrus' tusks, are called by that name and put to the same uses. Vegetable Ivory, which has come into general use within the last 25 or 30 years, is the seed of a tree closely related to the palms, which is a native of Central and South America, and is known in commerce as Ivory-nuts. These seeds are of the shape shown in the engraving, and that gives about the average size. They are packed closely in a rough, black shell or pod, as big as a man's head; this being very heavy, is borne so near the root of the plant that it lies upon the ground. Each seed has a hard, brittle, outer shell, partly broken away in the engraving. When young these seeds are soft and milky, but when ripe the "meat" is very fine grained and hard, almost as hard as ivory. It is easily told from real ivory as it is of a different kind of white; ivory is yellowish-white, while this is blueish-white and more transparent than ivory. As the seeds are small, as compared with an elephant's tusk, and have a small hollow place in the center, they can not be put to very many uses. Small knobs, parasol handles, and such wares are made from them, and they are used for making little spools, silk-winders, and similar trinkets.

Aunt Sue's Puzzle-Box.

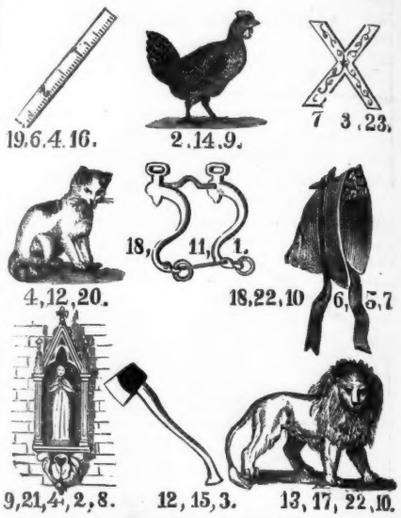
LESSON NO 2,

to the *grown folks* who wish to be instructed in puzzle-making.

"*I* don't know what you mean by 'concealed fish,' 'concealed fruit,' etc.," said a gentleman the other day. "Suppose you tell us all about it."

Well, to "conceal" a word, you must hide it in a closet made of two or three words, or within a longer word. Now, suppose I wanted to conceal a "shark." I think of words ending in s, and beginning with "hark," or ending in "sh," and beginning with "ark."

For instance, "Oh! Thomas, *hark!* there is the rising bell!" You will find the shark "hidden" in the two words "Thomas *hark!*" Or, if we say "Oh! I wish Arkansas were not so far away,"—you will find it concealed in the two words—"wi*sh Ark*ansas." I will hide an animal in the next four words—"*the sixteenth or seventeenth.*" Now, trace the letters regularly by five or six at



No. 460.—**An Illustrated Enigma.**—A very simple and easy illustrated numerical enigma for the little ones. It is composed of 23 letters, and if you get the items right, you will know what the whole is.

a time, beginning with the first, thus: "thesix"—"hesixt"—"esixte"; nothing there that looks much like "an animal"! Well, we go on until we get to "thors"—"*horse*"; ah! there it is.

It is all very well to be entertained by these puzzles, and to pass a pleasant evening in solving or making them, but if you can add instruction to amusement, do. When concealing anything, let it be something worth finding. Geographical names are good for such use, as it tends to fix the names and location of places in the mind. Rare birds, beasts, flowers, or plants, are useful, as they have a tendency to send those who make or who try to solve the puzzle to books of reference. Now, search the following sentences for the hidden words.

HIDDEN COUNTIES IN OHIO.

1. That is a very dark emerald.
2. It is trimmed in an elegant manner.
3. I have found it difficult to make all ends meet.
4. He sat down on a log and began to whistle.
5. I am going away next week.
6. Take care, that is a pretty cross dog!
7. I met Flora in the street.

HIDDEN DEITIES.

1. Pretty roses.
2. What a large apple!
3. I owe you ten dollars.
4. Shall I not pay you now?
5. Better late than never.
6. Tobacco must be pretty cheap.
7. I had some in a basket.
8. It is neither ornamental nor useful.

ANSWERS TO PUZZLES IN THE MARCH NUMBER.

SYNCOPATIONS.—1. Pine, pie. 2. Bread, brad. 3. Cord, cod. 4. Pearl, peal. 5. Stream, steam. 6. Horse, hose. 7. Rood, rod. 8. Acre, ace.

DOUBLE ACROSTICS.

1.—A—	lmon	—D	2.—J—	scobini—	C
F—	uchsi	—A	A—	w	—L
R—	ahwa	—Y	C—	hil	—I
I—	nconsisten	—T	K—	ora	—N
C—	air	—O	S—	mel	—T
A—	gal	—N	O—	rinoc	—O
			N—	inetee	—N

NUMERICAL ENIGMA.—And he that overcometh and keepeth my works unto the end, to him will I give power over the nations, and he shall rule them with a rod of iron.

ANAGRAMS.—1. Encroachments. 2. Interlocutor. 3. Acrobatic. 4. Inaugural. 5. Manufacturers. 6. Cultivators. 7. Vouchers. 8. Reconciles. 9. Interpenetrated. 10. Championed.

PUZZLE, No. 1.—London.

POSITIVES AND COMPARATIVES.—1. Show, shower. 2. But, butter. 3. Ring, wringer. 4. Ode, odor. 5. Stag, stagger. 6. Flow, flower.

PUZZLE, No. 2.

H A N N A H	Diagonal.
J O S E P H	HORACE.
D O R C A S	
O S W A L D	(A. L. S. sends 15 different,
E U N I C E	but correct answers to this
E U G E N E	puzzle.)

Thanks for letters, puzzles, etc., to T. M. Clark, G. B., J. W. B. V., "Nutmeg," W. J. F., Oriole, S. S. D., Belle, Jimmie, Mrs. L. L., and E. L. M.

Send communications intended for Aunt Sue, to Box 111, *P. O., Brooklyn, N. Y.*, and *not* to 245 Broadway.

A Very Puzzling Puzzle.

Mr. W. Y. W., Bucks Co., Pa., sends us a puzzle, which he had worked over a long time, and could not make out. As it belongs to Aunt Sue's Department, we sent the puzzle to her; to our surprise she returned it with "I give it up," or words to that effect. Of course, if she could'nt make it out, it must be more difficult than such things usually are, and we follow her advice and print it for others to try at. If it has puzzled Aunt Sue, it is hardly likely that you youngsters can master it—still you can try, and we put it in your columns so that you can ask your older brothers and sisters, and others to try at it. To make the puzzle, take a piece of stiff paper or card, of any convenient size, and exactly square. Then carefully mark eight equal divisions on each side, and rule across; this will divide the square into 64 small squares, as in fig. 1. Now cut the piece as shown by the heavy lines in fig. 1; first divide it in two unequal parts by cutting across three squares from the bottom. Draw a line across from corner to corner of the lower piece, and cut it in two there. Then cut the upper piece in halves, as

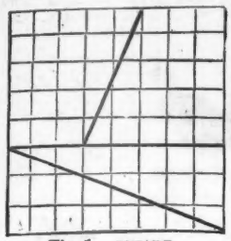


Fig. 1.—SQUARE.

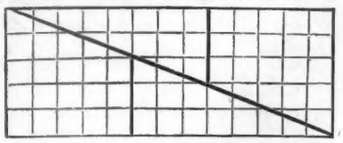


Fig. 2.—PARALLELOGRAM.

shown by the heavy line, taking care to get it exact by counting the squares. Your large square will now be in four pieces, which, put together as it was at first, has 8 squares on a side, or 8×8=64 squares in all. Now put the pieces together to form a parallelogram as in fig. 2, and if the work has been nicely done, you will find the small squares will all match. Count them, 5×13=65. Now where does the other square come from? That's the puzzle. No doubt those who are expert in geometry can make it out. Let us hear from them.

My Pet Birds.

BY J. H. P., FRANKLIN, N. Y.

Two years ago in June, a mother robin built a nest in a low evergreen, a few feet from the house, wisely judging that there she would not be molested by her worst enemy, the crow. Having occasion to pass close to the tree several times a day, and observing that she did not seem to be frightened, I began to take liberties with her, with the idea of seeing how near I could get to her. By slow and gentle movements I approached her nest, laid my hand upon her back, thrust my fingers under her wings, and felt the eggs. She was at first greatly frightened, but after a few days, by frequent handling, she became so gentle that I could put worms and bugs into her mouth, and even lift her off the nest, though she would not let me bear her away more than a foot or two, before she would jump back upon the nest again.

As the little ones increased in size, the old robin found it necessary to spend almost her whole time in hunting food for her little family of four, and consequently could spend but little time upon the nest. Yet in the middle of the afternoon, as the sun poured its heat down between the trees directly upon the nest, she would invariably return to it and cover her little ones until the friendly shadow of the next tree moved over and reached them and the shelter of her wings was no longer needed. And again, when it rained, she would extend her wings over the sides of the nest, so that not a drop of water could fall within. How did she know that the sun and rain would injure her babies? How was she taught to protect them from the heat and wet?

Soon after the old robin commenced sitting upon her eggs, a little sparrow came and made a nest in the same tree, only about eighteen inches from the robin's nest. As a rule, a sitting bird will not allow another bird to intrude in this way, but the sparrow selected the densest part of the tree in which to build her nest, which was completely hidden from view by overhanging branches. The two birds therefore had no reason to quarrel, for they did not know of each other's presence. The little sparrow was even more gentle than the robin, she would allow me to handle her as often as I chose, and would readily take from my fingers almost any kind of food I gave her, such as Indian pudding, boiled potato, bread, cake, meat, and worms of various kinds. When digging in my garden, I used to find cut-worms, which I carefully saved for my sparrow. A small cut-worm she would swallow while sitting upon the nest, but when I gave her a large worm, she would take it and fly off upon the ground, and then seizing it by the head, whip it right and left with great violence, until she had reduced its bulk, and then swallow it. If I gave her an angleworm, or a May-beetle, she would take it, and flying away a rod or two, drop it upon the ground, and then return to the nest. One day, finding a small green worm, I carried it to her, and I was well repaid for my trouble by seeing her rise up and drop it into one of the little mouths beneath. It seemed strange to me that, while she would eat heartily almost any kind of vegetable food I gave her, she would never give a particle of it to her children—for the reason, I suppose, that she regarded small worms more suitable food for baby sparrows. At length both the robins and the sparrows, getting too big for their nests, flew away, and I saw them no more.

The next (last) year the old robin returned, and built a new nest in another evergreen close by, but higher up among the branches. By placing a step-ladder under the tree, however, I could easily reach her, and I found her as tame and gentle as the year before. If she returns again next June, as I hope she will, I intend to study her habits and instincts more closely, and if I learn anything new respecting her, I will report.

Aunt Sue's Chats.

DOLLIE.—Yes, I can give you a *very* "simple pattern for working babies' flannel petticoats," and one quite effective and pretty. See figure 1. Scallop the edge with semi-circles, about as large as No. 70 cotton-spool would make; you can mark them with a pencil. Then rule, very lightly, four straight lines just above the scallops at *A, B, C* and *D*. In case you do not know how to make the feather-stitch needed for the *A* and *D* lines, I have given you a hint of the process in figure 2. Be careful to bring out the point of your needle on the pencil-line with every stitch. You can mark the vandyked line (which is to be chain-stitched) with the corner of a square card. When this line is finished, you can very easily mark the required dot in each point. The pattern without the scallop may be worked at the *top* of the hem.

In case you ever have to join a false hem on to a skirt

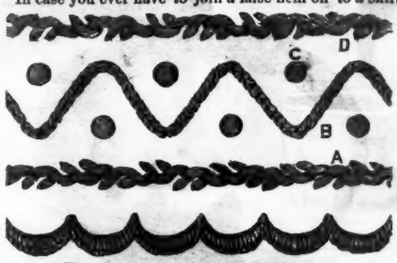


Fig. 1.—DESIGN FOR EMBROIDERY.

to lengthen it, a line of feather-stitch may be worked over the joining to hide it. With feather-stitch, chain-stitch, and worked dots, you can make many pretty patterns. (See figs. 3 and 4.) A simple way to get the pattern of a scallop is, to draw a circle around your spool at each end of your card (see fig. 5), then draw straight lines from one circle to the other at the top and bottom. Now move your spool along, letting it lap a little bit (unless you want a deeper scallop), and draw your pencil around it. When you have reached the end of your card, draw a straight line (as *A* in fig. 5) near the edge, and cut up to it between your scallops, as shown by the black portion in figure 5. Use Corticelli's embroidering silk, letter F. Linen floss (or white single zephyr worsted) looks very well, washes better, and is less expensive than silk.

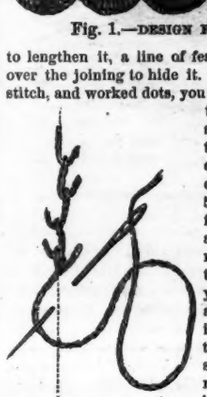


Fig. 2.—FEATHER STITCH.

Fig. 3.—PATTERN FOR EMBROIDERY.

GERTRUDE B. asks: "Will you please tell me the difference between cocoa and chocolate."—Both are from the seeds of the Cacao tree of South and Central America, which is very different from the Cocoa-nut tree. The

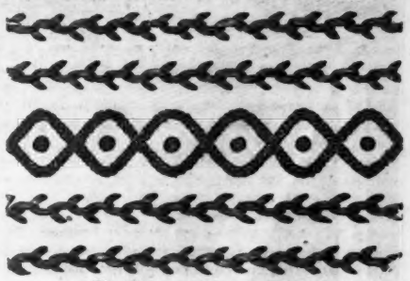


Fig. 4.—ANOTHER PATTERN.

Cacao tree rarely grows taller than 15 feet, and it bears fruit or pods about the size and shape of a common cucumber; these contain from 50 to 100 seeds, much the size and shape of an almond meat, surrounded by a pulp. The pods are buried in the earth, or covered in close tubs for a while, until the pulp has fermented, after which the seeds are taken out, exposed to the sun for several days, when they are ready to use or to send to other countries. Great quantities of these seeds, cocoa beans as they are called, are imported, and various preparations are made from them. Like coffee, they must first be roasted, before they are used, but they are not browned so much

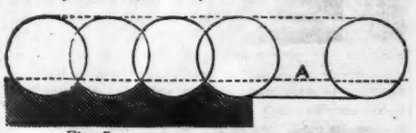


Fig. 5.—HOW TO MAKE A SCALLOP.

as coffee. When roasted, the thick skin or husk of the beans is very brittle, and this is broken and separated from the kernel. These husks are sold as "cocoa-shells" in this country, and as "miserable" in England, and are used by the poorer people. The kernel itself, coarsely broken, and often mixed with the husks, is sold here as "cracked cocoa," and in England as "nibs." All the articles called chocolate, and some with other names, are made by grinding the kernels. These contain about half their weight of a kind of fat, and when ground in a stone mill of proper form, and which is kept warm, the cocoa kernels grind up to a smooth paste, which is put into molds, where it hardens, and this is pure chocolate. It is, however, rarely pure. Commonly half their weight of sugar is added to the beans, and vanilla is put in to flavor. This is the kind of chocolate that many like to eat. Then some chocolate is mixed with starch or flour, to make it cheaper, and of course this is a fraud. Various fancy names are given to different preparations of the cocoa bean, such as "Soluble Cocoa," "Homœopathic Chocolate," "Broma," and others. In general, "cocoa" is the name for the whole or merely crushed bean, while chocolate is the proper one for those forms in which it is ground into a paste.

ALICE.—The term, "carnival," is the name of a festival, especially celebrated in Catholic countries, during the week before Lent. It is derived from the Latin "carni," an inflection of *carno*, meaning flesh, and "vale" farewell. It means, really, "good-bye to roast beef," meat being prohibited food during the lenten season.

"W. J. W."—Your enigma is excellent, but a little abstruse. I must take some liberties with it if I publish it.

A Spring Day in the Country.

"Spring!—When is it spring?"—The answer to this would depend upon where the boy or girl lived; we all know when it is spring with *us*, but our division of the seasons will not answer at all for those who live at the other side of the equator, for there the seasons are reversed. We call March, April, and May, the spring months, but in England spring begins in February, and summer in May. Then astronomers have a spring of their own; their spring begins at what is called the vernal equinox, March 21st, when the days and nights are equal in all parts of the world. If we call April the first spring month, we come very near to the astronomical spring. Our young friends who live in Florida and other far southern places, and those who are in California, have well nigh forgotten about spring, it came so long ago, while this paper will reach some far northern children, who are just watching for butter-cups and dandelions, and other early flowers. Though May is the last of the spring months, as we generally divide the seasons, it will be to many of our little folks the first one in which out-door play can really be enjoyed. March with its bluster, April with its showers, and often long, cold rains, both prepare the way for May, and even a good

IN THE BARN ON A BRIGHT MAY MORNING.—*Drawn and Engraved for the American Agriculturist.*

part of May must pass before the real pleasant days are here. And then how pleasant they are! What can equal a perfect day in May? No doubt many of you, in reading of tropical countries, where frost and snow are not known and winter never comes, think how fine it must be, and it may be that you think the children who live in these countries must have a much pleasanter time than you have. Just think of it! no going to school through the snow with muffler and mittens; no fires to keep up; but summer, with birds and flowers the whole long year. There are many pleasant things about such a country, but in the lands of continual summer, as well as in your own, there are some things lacking. The children in the tropics are deprived of one thing which you, who live farther north can enjoy—that is spring. They may divide up the year into seasons, and call one of them spring, but the real thing they do not know, and they can not see that wonderful awakening that follows the sleep of winter. The birds of the tropics are bright with color and gold, but the note of a blue-bird is better than all the gay plumage, and the greening of the grass, the bursting of the buds, and the sudden clothing of tree and shrub, with leaf and flower, is one of the most wonderful sights in the world, and one which makes us soon forget the few discomforts of winter. Then in these fair May days, when it is more pleasant to be out than in, when we put aside the winter plays, and begin almost a new life, how glad we are that it is not always winter—or always summer either, for without winter there can be no real spring. You whose life is passed in the country, hardly know how much you have to enjoy, which is denied to city children. To be sure, many city children can visit the parks, and see a bit of country there—a piece, as it were, kept as a sample, so that people may not forget that there are brooks, and trees, and grass. But the mass of city children, those of parents whose means force them to live in crowded houses in crowded streets—what do they know of spring! The few street trees put out their foliage, the grass in the little back yard struggles against much tramping, the flower venders come along with their pots of plants, they see green stuff at the corner markets, and notice the changes in the dress of people—and they enjoy even these few sights. But you in the country! be thankful that no brick walls shut out the view of meadow, wood, and mountain, and almost the sky, and that there are none so poor, but they are rich in a share of so much beauty. What will we do in these glad spring days? Indeed there is so much to do that you wonder what you will do first. Let us go to the brook and see how the dam we made last fall has stood the spring floods, and gather marsh marigolds at the water's edge—now over to the woods, where the blood-root is showing its pearly buds, then to the big rock, at the foot of which are always the first violets; let us go home through the orchard, to see if the robins are using their old nests; then to the garden—our little garden, where the flowers are coming on finely, and so are the weeds. Too tired are you to do the weeding now? well then, here is the barn, and the swing, and such a chance to rest! The easy motion of the swing soon makes us forget fatigue; the sunlight streams in at the big door, and without we see the tender green and the tinted blossom buds of the orchard, and the song of birds, and the chirp of the chicks, are among the pleasant sounds that add to our enjoyment of this most charming of days—a perfect day in May.

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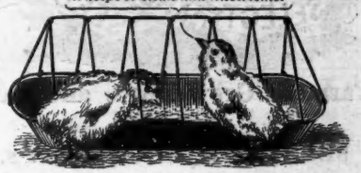

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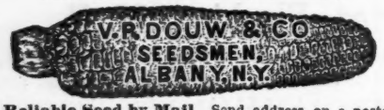

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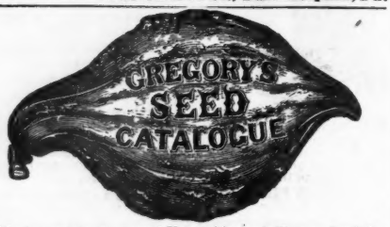

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Quinby's "Bee-Keeping Explained." Box material for as practical a box as can be made. Glass cheaper than before. Extractors, Queens, Hives, Hive-Clasps, Colonies, Bee Veils, etc.
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We offer 10,000 well rooted young Hy. Perp. and Tea Roses, grown from our collection of over 500 varieties,
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Used extensively North and South for four years with great success. Send for our Pamphlet, containing the experiences of scores of farmers, before you buy elsewhere. **Sent Free.**

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Your attention is called to

Sardy's Phospho-Peruvian Guano
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Dissolved Bone Phosphate,

Which, after twelve years' practical test, have proved themselves to be the best and cheapest fertilizers in use, the crops in many instances being

More than doubled by their use,

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Strictly Pure. Analysis Guaranteed. Send for circular.

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Fish Guano.

Dry Ground Fish Guano, 8 to 10 per cent Ammonia: 15 per cent Bone Phosphate of Lime.

Half-Dry Fish Scrap, good quality. Also **Superphosphate** and **Pine Island Guano.**

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Premium Pure, ODORLESS, Fine Ground RAW BONE, produces luxuriant grass. Sow now on land newly seeded. **Perfectly Inoffensive.** Very popular with Ladies and Gentlemen for house plants, **Lawns,** Gardens, and the Grapery. It never fails in producing grain crops. Send 20 cents for invaluable book, showing composition of cereal grains, and how to grow them. Address

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Special Formula for Tobacco.

We have recently added to our List of Formulas, prepared in accordance with the system of Prof. Ville, a SPECIAL MANURE for TOBACCO, prepared from PURE PERUVIAN GUANO, HIGH GRADE SULPHATE OF POTASH, PURE GROUND DRIED BLOOD or FLESH, and PLASTER.

The composition of this formula will be found to exactly correspond in Ammonia, Phosphoric Acid, and Potash to the demands of the Tobacco Crop. (See Table by Prof. W. O. Atwater given below.)

The Ammonia is reduced proportionately in this formula to one half, leaving, as practised by Prof. Ville, to the natural capacity of the Tobacco plants the absorption of the balance of the Ammonia from the atmosphere.

Removed from the Soil by a Crop of Tobacco:

Leaves	1,800 lbs., (1,260 lbs. dry.)	Nitrogen	82 lbs., (equal to Ammonia, 100 lbs.)
Stalks	1,100 lbs. dry.	Phosphoric Acid	22 lbs.
		Potash	118 lbs.

1,000 lbs. of this TOBACCO FORMULA contains of:

Nitrogen.....50 lbs. | Phosphoric Acid.....50 lbs. | Potash.....119 lbs.

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This formula, as well as all others supplied by us, is furnished at prices based strictly upon our established low schedule of rates, namely, Ammonia, per lb., 17½c.; Phosphoric Acid, per lb., 9c.; Potash, per lb., 7½c.

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Price per ton of 2,000 lbs., when shipped in lots of two tons and upwards in the **form of the Ingredient in their original packages** **$44.34**

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The Mapes Formula and Peruvian Guano Co.,
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SILVER MEDAL

Hand Seed Drills and Wheel Hoes,

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Timber and Wire, Seabury's Patent, making the best and most economical fence in the world for farm, railroad, and ornamental use. **Prices from $7.00 per 100 feet upward,** delivered on route of transportation complete for setting up.

Manufactory, **Nos. 80, 82, 84 & 86 Mangin St., 67, 68, 69 & 70 Tompkins St.,** where various styles can be seen erected.

Send for descriptive circular to

PRINCIPAL OFFICE, **86 Mangin Street,**
BRANCH OFFICE, **100 East 14th St., N. Y. City.**

Galvanized Cable Fencing.

Proof against **Cattle, Fire,** and **Rust.** Hundreds of miles erected. Handsome, durable, cheap.

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For FARMERS.

Best Tempered Cast-Steel.
Retail Price, 9 Cents per lb.
WARRANTED. ☞ Send for Circular.
Fisher & Norris, Trenton, N. J.
ALL SIZES, from 10 lbs. upwards.

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Twenty-four years old. Total assets for the security of Policy holders January 1st, 1877, $1,050,622.00. Insures only Farm Property and Residences against fire and lightning. Takes no business risks.

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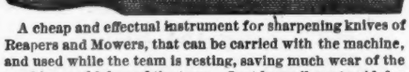

A cheap and effectual instrument for sharpening knives of Reapers and Mowers, that can be carried with the machine, and used while the team is resting, saving much wear of the machine, and labor of the team. Sent by mail, post-paid, for 30 cents. A liberal discount by the dozen. Try them.

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Woodruff's Portable Barometers
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For Children.

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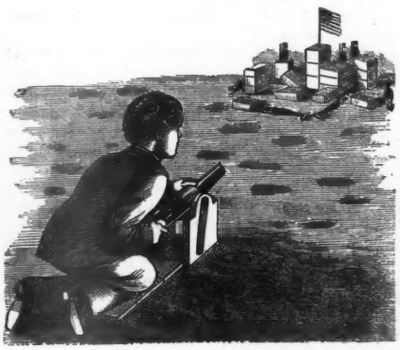

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The greatest amusement of the age! Recreation at home for all ages and for all seasons! Crandall's Heavy Artillery is made up of a large Cannon, complete, which throws a 1¼-inch Rubber Ball to the distance of 25 feet or more, and Sixty Blocks (Red, White and Blue), to build up Fortifications, also a Company of Soldiers, with Officer and Flag, to Garrison the Fort. The Game is to beat down the Fort by the use of the Big Gun. Rules, Illustrations of a variety of Forts, etc., accompany each box containing the set, and the box is 18 inches long, 6 inches high, and 8 inches wide.

Price per Set, $3.00. *Expressage to be paid by the recipient.*

CRANDALL'S WIDE-AWAKE ALPHABET.

No more long faces and no more tears over A B C! Here we have amusement and instruction combined. Each box contains twenty-seven little men, each representing a letter, with arms, legs, and jolly faces. This set of Blocks is susceptible of more changes, and a greater variety of forms and combinations than any Spelling Block ever offered to the public. The Pieces are durable, the Letters plain, the Faces mirthful, and the Amusement afforded by them unlimited. They please while they instruct, and are a source of enjoyment to young and old.

Price per Box $1.00; *by mail, prepaid,* **$1.50.**

CRANDALL'S JOHN GILPIN.

This beautiful and interesting toy is regarded by Mr. Crandall as one of the best of his inventions for the little folks. It is made up of two figures, John Gilpin—whose highly colored dress is specially attractive to Boys and Girls—and his Horse, which intelligent animal performs a very important part in the illustration of Gilpin's famous ride.

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CRANDALL'S TOY HORSE.

Here is something that will make glad every little boy that gets it. The Toy Horse is about 6 inches in hight to the tops of his ears. He stands upon a four-wheeled base, all ready to be set in motion by his owner. He is made up in pieces and can be taken apart and laid snugly away in his box.

Price 25 Cts.; *by mail, prepaid,* **35 Cts.**

CRANDALL'S LITTLE ALL-RIGHT.

One of the funniest and most amusing of the low-priced toys. The lively little All-Right throws himself into a great variety of positions as he whirls around the "wheel." Can not be sent by mail. For sale by Toy Dealers generally.

"Ye HERO OF '76."

The great "Centennial Toy." A fine old soldier in a brilliantly colored uniform, with cocked hat, staff, and flag, all put up in a neat box. The Hero is so constructed that he can be placed in almost numberless and amusing positions, and will delight the children everywhere.

Price 35 Cts.; *by mail, prepaid,* **45 Cts.**

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Full of fun and frolic, and most brilliant in costume. These are among the most fascinating and ingenious toys ever invented. The number of figures which can be made with the pieces in a single box is limited only by the ingenuity of the operator.

Price $1.00; *by mail, prepaid,* **$1.25.**

CRANDALL'S MENAGERIE.

One of the most wonderful and amusing things ever brought out for the entertainment of children. The six animals composing the menagerie are beautifully painted, and so arranged into 56 pieces in each box, that tens of thousands of most laughter-provoking figures can be made up with them.

Price $2.00. [*Purchaser will pay express charges. Box too large to go safely by mail.*]

CRANDALL'S BUILDING-BLOCKS.

Can be made into forms of almost endless variety. The blocks are put up in neat, strong boxes, and a large sheet giving various designs of buildings, etc., accompanies each box.

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No. 3, $1.00; *by mail, prepaid,* **$1.25.**
No. 4, $1.00; *by mail, prepaid,* **$1.15.**

CRANDALL'S ILLUMINATED PICTORIAL ALPHABET CUBES.

These Cubes are gorgeously colored, and will make over 500 beautiful combinations or figures. They are water-proof, odorless, and durable; put up in handsome black walnut boxes; and are most attractive to both young and old—an elegant present for the little ones.

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CRANDALL'S MASQUERADE-BLOCKS.

Making 300 different and beautiful Combinations of Pictures, which are in very brilliant colors. They are not injured by washing, do not wear out, and afford endless amusement.

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CRANDALL'S EXPRESSION-BLOCKS.

With Letters on one side, Picture on the other. The Alphabet is the key to the picture which, when complete, represents the inventor in Dream Land. These Blocks are water-proof, and can be washed if soiled.

Price 50 Cts.; *by mail, prepaid,* **70 Cts.**

CRANDALL'S ALPHABET-BLOCKS.

Red, White, and Blue.

Tasteless, odorless, and water-proof. The letters are on red, white, and blue ground. All children are pleased with them.

Price 75 Cts.; *by mail, prepaid,* **$1.00.**

N.B.—*If postage is not remitted with the prices, as above, the blocks will be sent by express at purchaser's expense.*

Orders from the trade will be supplied on liberal terms.

ORANGE JUDD COMPANY,
245 BROADWAY, NEW YORK.

containing a great variety of Items, including many good Hints and Suggestions which we throw into smaller type and condensed form, for want of space elsewhere.

Continued from p. 129.

To Manage Stubborn Cows.—"G. M.," San Bernardino, Cal. To persuade a cow to give down her milk against her will, is a difficult and sometimes a hopeless task. A plan that has been highly spoken of is, to lay a heavy chain across her back while milking her. It is very certain that harshness and impatience will only make matters worse, and that kindness and petting will have the best effect. The use of the milking-tubes recently mentioned in the *American Agriculturist* might be effective. A poor cow, free from this vice, is better than the best cow that is afflicted with it.

Fall Wheat for Spring.—"F. M. H.," Warren Co., Ohio. You can not sow fall wheat in the spring in place of spring wheat, with success in Ohio. It is not a spring wheat district. It is the climate that is the obstacle, and not the kind of wheat sown. In 1870 Ohio produced 27,625,729 bushels of winter wheat, and only 256,400 bushels of spring wheat. In a few of the northern counties spring wheat may be grown. In Warren Co. in 1870, 427,624 bushels of winter wheat were grown, but not one bushel of spring wheat. This is conclusive. Oats or barley should be grown in such localities for spring crops.

Seeding to Clover.—"W. H. A.," Hagerstown, Md. It is not too late to sow clover seed, especially if it is sown alone. In many cases this is to be preferred. The soil should be made as fine and mellow as possible, and the clover sown immediately after the harrow. Then a long plank drawn sideways across the field, will cover the seed very quickly, and will leave the surface smooth. In this way we have had a fine growth of clover, and a very close and perfect stand.

The Color of a Calf's Nose.—"A. S.," Montgomery Co., N. Y. The color of a calf's nose is only skin keep, and can only be a very uncertain indication of the character of the animal. Alone it is of no significance. If the calf is promising in other respects, the color of the nose, whether black, white, red, or mealy, is immaterial. But if the color of the nose is the only good qualification, it will be a very poor calf indeed.

Holstein (?) Cattle.—"New Subscriber," High Bridge, N. J. There are no Holstein cattle in America. Those called by this name are really Dutch cattle from North Holland, and entirely different from the cattle of Holstein. They are large coarse-boned cattle, invariably black and white in color, great milkers, with short horns, are large feeders, and very hardy. They are excellent dairy cows, but to be profitable require a cool moist climate, and luxuriant pastures.

The Best Butter Cows.—"C. McK.," Hudson, N. Y. The best cow for the butter dairy is undoubtedly the grades of the Jersey breed. Mr. Thomas Fitch, of New London, Conn., has made a special business, for many years, of breeding butter cows for family and dairy use, of both grade and pure Jerseys. His opinion of the value of grade Jerseys, was recently given in an article in the *American Agriculturist*, which was widely copied by other journals and favorably noticed, showing that this class of cows stands well in popular estimation.

Coal Ashes for Poultry.—"V. R.," East Morrisania, N. Y. There is nothing better than dry sifted coal ashes to throw into your poultry house during the winter. The fowls pick out of them many pieces which serve in place of gravel in their gizzards, and can dust themselves as they may feel inclined. These ashes are most excellent to absorb the droppings, and should be occasionally scraped up, removed, and preserved in a dry place for use in the garden or fields, of course replacing them by a fresh supply.

A California Plow.—The largest plow, probably, ever used, is one in California, made for Mr. Souther, in Kern Co., for ditching his land. It has a beam 14 feet long, 18 inches deep, and 6 inches thick in the widest part; the mold-board is 10 feet long and 3 feet wide, and makes a furrow 5 feet wide, and 3 feet deep. It weighs a ton, and the chain by which it is hauled, also weighs a ton; 80 oxen and 10 drivers are employed to work it. This immense plow moves about six miles a day, leaving behind it a ditch of the size mentioned.

Fertilizers for Wheat.—"S. W. P.," Marshfield, Vt. Nitrate of soda and potash salts should be used together, one will not replace the other. Generally, the soil is more deficient in potash than in nitrogen, and it is scarcely ever that potash in some shape or other fails to have a favorable effect.

Docking Horses.—"H. M. F.," Hamilton, Pa. It is a very common practice in Europe, (England included), to dock the horse's tails. This is done by cutting off a portion of the young colt's tail. The operation is perfectly safe The skin is first drawn forward towards the stump, and the tail is separated at a point of the vertabræ. The wound is then canterized with a hot iron. An instrument made for the purpose is used for severing the tail, which operates instantaneously. The erect carriage of the docked tail is secured by canterizing the ends of the tendons which run along the upper part of the tail, while the tail is erected, by a pointed iron. This fixes the tendons in their shortened condition, and holds up the tail. It is to be hoped that this barbarous and cruel fashion will not become prevalent in this country.

Caponizing.—"J. A. C.," New Castle, Pa. Directions for caponizing are given in Lewis's "People's Poultry Keeper," for sale at this office, price $1.50. The instruments are sold by H. H. Stoddard, Hartford, Conn. Capons sell very steadily at 25 to 30 cents a pound, when fowls sell from 8 to 20 cents, according to the supply.

Cheap Farms.—"P. A. B.," Lock Haven, Pa. A low-priced farm may be a very dear one. There are hundreds of farms, valued at $15 to $20 an acre, that are really dearer than others at $100 to $200 an acre, because the one requires a large outlay in manures, fences, or buildings, before it can be worked with profit, while the others will return a good profit for labor without any such outlay. It is more profitable to raise 100 bushels of grain at 25 cents a bushel with $10 worth of labor, than to raise 25 bushels at $1 a bushel with $20 worth of labor and fertilizers. This is precisely the difference between the low-priced rich lands of the West, and the low-priced poor lands of the East. But there are other considerations which influence persons in their choice of homes, and thereupon some go west and some stay or go east. On the whole, those who have homes might do better to stay upon them and improve them, than to leave them for a distant one in which they are no better off, and continually regret the change. There is more comfort in contentment than is generally known.

Export of Barley.—A very uncommon arrival recently took place at Queenstown, Ireland; this was a cargo of American barley, shipped from New York. The sample was of excellent quality, and was favorably received. Several other cargoes from New York are reported as being on their way to foreign parts. Up to the present time the trade has flowed the other way, and there have been large imports of barley every year. Barley may now be considered as a staple article of export. To maintain the trade, farmers must take care to produce a good sample, perfect in color.

An Infertile Bull.—"M. C. H.," Stuart, Iowa. Short-horn bulls are not so precocious as Jerseys, and should not be used at so early an age as the latter may be. A Short-horn bull in his second year may serve a few cows, and six or seven in the next year, but if used severely in his second year, the probability is that he will be spoiled for future use. This is probably what is the matter with your animal. It might be useful to keep him one year idle, and break him to the yoke, making him work occasionally. See article respecting this in *American Agriculturist* for August, 1875.

How to Saw a Log True at the Ends.—"O. T. R.," Independence, Ks. Experienced sawyers find no difficulty in sawing logs true at the ends. The saw must be set and filed even on both sides, and then, if the handles are held upright, and a right start is made, the cut must be true. If the saw is badly filed and set, it will run to one side, in spite of a good sawyer. A guide for inexperienced sawyers may be made by fastening a cord around the log in the proper position, and sawing close to it without touching it.

Fertility of Dairy Farms.—"W. W.," Elgin, Ill. Much nonsense is circulated in regard to the rapid loss of fertility of dairy farms, by reason of the carrying away of the phosphates in the milk. Now 1,000 lbs. of milk contain about 3 to 4 lbs. of phosphates, of which nearly the whole is phosphate of lime. Of this less than half is phosphoric acid; 5,000 lbs. of milk, therefore, contain but 7½ lbs. of phosphoric acid, which may be taken as the yearly consumption, in this way, of each cow. As wheat bran contains 2.9 per cent of phosphoric acid, it needs only that about 250 lbs. of bran be fed to each cow, yearly, to replace the draft upon the soil. There are few dairy cows that are fed less than this quantity of either bran, or some food equivalent to it, and it is pretty certain that very little, if any, phosphoric acid is really taken from the soil of dairy farms. On the contrary, to say nothing of the natural supply in the soil, which slowly becomes soluble, there is good reason to believe that every well kept dairy-farm becomes gradually richer in phosphates every year.

Another Good but Nameless Cow.—"Mrs. A.," Passaic Co., N. J., sends an account of her four-year-old cow, which produced 108 lbs. of butter from 23d Nov. to 2nd Feb. last, or 71 days; besides 100 quarts of milk for table use.—The daily yield ranged from 18 to 22 quarts. The cow's pedigree is unnamed and unknown, although she bears a strong resemblance to the Jersey cows pictured in the *American Agriculturist* of February.

Strength of Concrete.—A very valuable and interesting paper was recently read before the British Association of Gas Managers, upon the use of concrete in gas works. It was stated, as the result of very numerous experiments, that a concrete of pure cement, which had a strength represented by 1,200 lbs., when six months old, acquired a strength of 1,600 lbs. in three years; and a concrete of one part cement and two of sand, which had a strength of only 246 lbs. when fresh, at the end of three years resisted 1,174 lbs., and became equally strong as pure cement at six months. The absolute strength of Portland cement concrete, at nine months old, was equal to a pressure of three tons upon a square inch of surface, while good building sandstone resisted only one ton on the square inch. The cement is three times stronger than sandstone. These tests are important to those who may use concrete for building.

To Get Rid of Stumps.—"T. R. M.," Flint, Ind. There have been many foolish things said and printed about saturating stumps with oil or saltpeter, to cause them to burn out, or to set a length of stovepipe on the stump to make a draft so as to consume it. All these plans are useless, and would fail. The practical methods are: to wait until they rot, to pull them out with a stump-puller, to dig them out, or to blast them out. This last method is the cheapest and quickest.

The Berkshire Record.—"J. C. F.," Sabula, Iowa. The Berkshire record can be procured of A. M. Garland, Secretary, Springfield, Ill., for $3. Entries in this record are not a guarantee that the stock is pure bred, as there is only the breeder's word for it, and that is just as good without the record. So far as we know, there is nothing to prevent any person entering any pigs he may please under any name he chooses, as the progeny of sows which may never have had a pig, if he is sufficiently unprincipled.

Sheep Gnawing Fruit Trees.—"G.," Livingston Co., Ill. Sheep will occasionally gnaw the bark of trees, when pastured in an orchard with a good bite of grass. The seem to need something bitter, which the bark supplies to them. If they are regularly provided with salt, they will seldom touch the bark of old trees, except in the winter. To prevent it, take cow dung and clay, and make a paste with which smear the trees as high as the sheep can reach. If some blood is smeared over the bark, it would be equally effective. Either of these will keep off rabbits also.

What is Thoroughbred?—"J. H. S.," Logan, Ind. Five crosses entitle an animal to entry into the Short-horn Herd-book. It is then called a thoroughbred, but it is not in reality. Many years of breeding in a distinct line, or with selected animals of like character, until the progeny reproduce themselves exactly and with certainty, are requisite to make a pure breed, and the direct descendants of such animals are thoroughbred. As the term is now used it is loose and only approximate.

Alsike Clover.—"W. W." Alsike clover is neglected as a fodder plant. It has not succeeded in competition with red clover. Its habit of growth is slender, and it does not yield a heavy burden of stems and leaves. It is not profitable as a hay crop, and its place seems to be chiefly as a help to make up a pasture on low, moist places, where red clover may not succeed so well. Wherever red clover can be grown, we would not advise any one to abandon it for Alsike clover.

The Polled Breeds of Cattle.—A wonderfully strange prejudice exists against cattle without horns. The absurd and contemptuous name "mooley," sticks to them, although they may belong to a breed as old and as high bred as the Short-horns. The Polled Angus Cattle are equal to the best beef breeds living. That they are without horns, is an additional recommendation that should make them very popular amongst graziers and drovers. Without the injurious weapons of attack, they are docile, easily controlled, and the stronger can not abuse or injure the weaker, as it is the nature of all animals to do.

A Variety of Questions.—"F. S." Air-slacked lime is very suitable for liming land—the finer it is the better. There is no better process than air-slacking for preparing lime for land. Lime may be kept for a length of time in air-tight barrels, in a dry place....True molasses will not change into sugar; but if some crystalizable sugar remains in the molasses it will be slowly deposited at the bottom of the vessel. Before using the sugar it needs to be drained; hang it up in a coarse bag..Sorghum of the common variety will ripen in Iowa and will yield molasses, but not sugar. No successful process of making sugar from it has been as yet discovered... Plaster (gypsum) may be sown by hand or by Seymour's broadcast sower. Use 100 pounds per acre....Of lime, 25 to 50 bushels of lime per acre is generally used; scattered upon the surface and never plowed under....Peruvian guano, when pure, is good for all soils and all crops; 150 pounds per acre is a fair quantity to use....Milk and cream for churning should be kept at a temperature of from 40 to 50 degrees.

Diseases of Swine.—Many persons insist that the prevalent diseases of hogs, especially that one known as hog-cholera, is known in no other country, and that America should have all the credit, or discredit, for the possession. But there is nothing new about this disease. It prevails widely and fatally in England, where it goes by its proper name of typhoid or enteric fever. We notice a recent case, in which, of a herd of 32 hogs sent to market in England, 30 died of this disease on the way. If the pretended mystery about this disease were abolished, and it was acknowledged that it has a rational and natural cause, the first and greatest difficulty in the way of preventing it would be removed.

A Mare that won't Plow.—"M. M.," Alexandria, Va. A horse that has not been used to the plow, is rendered fearful by the strangeness of the implement and the manner of hitching. In such cases we break the animal to the plow by first hitching to a log and drawing that, leading the horse by the head. Then hitch to the plow with the point upon a plow shoe, and draw that; then plow a light piece of stubble, for half a day. By patience and kindness any horse may be taught to plow in a short time in this way.

Feeding Hogs for Profit.—"E. S. C.," Douglas Co., Kansas. As the price of pork in the great corn-growing States usually depends upon the price of corn, it ought to be a profitable business to turn corn into pork, even though the corn has to be purchased. It is impossible, however, to tell what future prices may be, and one who goes into such a business as this, may expect to lose money sometimes, and to make a profit at others, to cover his losses. It is not likely he could make money every year, as prices fluctuate so greatly.

Sawdust for Poultry Houses.—"Mrs. R. S. H." Sawdust is not to be recommended for use in a poultry house. It harbors vermin. There is nothing better for the floor of a poultry house, than clean, dry earth upon an earth floor. The floor should be scraped over with a hoe or a broad scraper every week, and the loose earth and droppings removed. They may be stored in barrels, for use upon the garden, or be scattered directly upon it. Then some fresh earth should be thrown in, or fine sifted coal ashes will be useful.

A Sick Horse.—"O. A. G.," Pelham, N. H. Rosin is not a good thing to give to horses for difficulty in urinating. It excites the kidneys for a time, but leaves them worse than before. When the horse has, as yours, a chronic disease of the kidneys, the best course is to give only moistened cut feed, with but little corn, and only sound, good oats, ground with rye or rye bran. One ounce of salt should be given with each feed, and when any trouble occurs, give half an ounce of saltpeter, or one ounce of gunpowder, powdered and mixed with the feed. Never overwork the horse, and never give water when tired, nor more than half a pailful at a time.

No More Gambling at Agricultural Fairs.—The lower branch of the New York Legislature has passed a bill prohibiting pool-selling, both upon or away from race tracks, fixing the penalty for a breach of the law at a fine of $2,000 and two years' imprisonment. This removes one of the chief objections against trotting matches at agricultural fairs, and will go far to induce a more numerous attendance of farmers at these gatherings than heretofore. The example should be followed in every State, and above all things *enforced*.

Three-Horse Eveners.—We have received many descriptions, with illustrations, of eveners for three horses, by the use of which one horse may be enabled to draw on one side of a pole or chain, against two horses on the other, without increasing the length of his end of the evener, or what is equivalent thereto, and without side draft. While we are thankful to our friends for their kindness in sending these illustrations, we are compelled to say that they are all wrong, and that the thing can not be done. No combination of pulleys or levers, can balance two pounds against one, on an equally divided beam, or even suspend these, without making the two pounds tend to draw the support over towards its side.

Minks and Minkeries.—"E. J. N.," Fort Plain, N. Y. The only minkery in existence, that we know of, is that of Henry Resseque, Verona, Oneida Co., N. Y. Wild minks could probably be procured of R. E. Robinson, Ferrisburg, Vermont.

Prices of Short-horns.—The speculative prices of pure-bred Short-horns seem to have reached their limit. Instead of thousands of dollars, hundreds can now buy one of the cream of the herds. It has not been an evil, perhaps, that this fine breed of cattle has been the foot-ball of speculators for some years, as it has brought them to the notice of every reading farmer. Now that they have reached about their intrinsic value, farmers who can raise heavy beef cattle, or heavy dairy cows, may provide themselves with pure bred bulls at moderate prices. At a sale of the Excelsior herd some time ago, bulls were sold for from $45 to $230, which latter figure was the highest price paid for a bull. However much the herd may have deserved the name given to it, there was not much "excelsior" about these prices, and this is a source of gratification to those who wish to see the noble breed filling its proper and important place in agriculture.

Fertilizer for Wheat.—"G. P.," Trumbull Co., Ohio. One of the best artificial fertilizers for wheat, to be applied in the spring, is nitrate of soda. 100 lbs. of this, per acre, should be sown evenly over the wheat as soon as it begins to grow in the spring.

Prevention of Over-reaching.—"J. L. L.," Martinsburg, W. Va. The clicking noise, caused by the toe of the hind shoe striking the heel of the fore shoe when a horse is trotting, is the effect of what is known as over-reaching. This may be prevented by lengthening the toes of the hind shoes, and shortening those of the fore ones. This will enable the horse to lift the fore foot a little quicker, and will slightly retard the hind feet; but it is enough to clear the fore foot. A very small fraction of a second, probably a hundreth part of one, will be sufficient gain of time to prevent the contact.

Muck and Marl.—"S.," Easton, Md. A compost, to be of any effect, must have some active fermentible matter in it. Muck and shell marl together would be quite inert, but if caustic lime were mixed with a quantity of these materials, they would be decomposed and made useful. One bushel of fresh oyster-shell lime, mixed with a wagon-load of the muck and marl, would be proper. The compost, along with some stable manure, would be beneficial for grass or corn.

Corn on Fall Plowing.—"E. H. C.," Lee Co., Ill. Upon prairie soils, where much is planted, fall-plowing will be proper for corn, but where clover-sod is to be turned under, and the breadth planted is small, spring-plowing is preferable. Corn starts into growth quicker, the weeds are not so numerous, and the crop thrives better upon ground plowed just before planting. Where corn is largely planted, fall-plowing must necessarily be done.

Shed with movable Roof.—"B. E. B.," Fayette Co., Ind. A shed that will be useful to stack wheat under, is described and illustrated in the *American Agriculturist* of October, 1875. The roof can be raised or lowered, and is held in the desired place by pins inserted in the posts.

Value of a Phosphate.—"W. W. C.," Harford Co., Md. A phosphate containing 3 per cent of soluble phosphoric acid; 4 per cent. of reverted and 5 per cent of insoluble, with 1¾ per cent of ammonia, is worth about $25 a ton. It is a very poor fertilizer.

Technical Education.—To know how to do one thing well is, under our present circumstances, more valuable, than to partly know how to do many things. The tendency now is, to make a single chosen pursuit the business of one's life, and this is made necessary by the present close competition in all industries and professions, in which a person who knows but little of the technical portions of them, can not compete with those who are experienced and expert. It is so in farming, in which there is now so great a competition, that only expert men can succeed satisfactorily. Others may make a living at the business, but that one may live comfortably, and improve his circumstances, he must have a *thorough* acquaintance with his art, and a sufficient knowledge of the other arts and the sciences, with which his own is very closely connected. Without this knowledge, he has an uphill struggle, and meets with so many losses and disappointments, and so many failures, that he becomes discouraged. Is not this the reason why so many farmers are desirous of changing their positions; of selling out, and going to some new place, of which "distance lends enchantment to the view?"

Swelled Legs in a Horse.—"S. W. S.," Ansonia, Conn. The fact that a horse's legs swell more when kept standing upon a plank floor, than when he stands upon the earth, should be sufficient to induce a change of floor to be made. It may be that the floor slopes backward too much, and thus throwing too much strain on the hind legs, causes the swelling. Too much standing in the stable will, in some horses, produce this effect. Perhaps a remedy may be found in keeping the horse in a roomy loose box (12 x 12 feet), in which he can move about freely. The legs may be bathed in cold water in the evening, and rubbed perfectly dry with a coarse woolen cloth, using considerable friction.

Western Kansas.—"C. C. K.," Edwards Co., Kan. We would not advise persons to engage in farming in the extreme western part of Kansas, unless irrigation is practised. The advantages of irrigation in this locality are discussed favorably in a new work on Irrigation, by Henry Stewart, published by the Orange Judd Co., which might be consulted with benefit. In that part of Kansas there are ample facilities for profitable irrigation. The country is well adapted to stock raising.

Fertilizers for Mangels.—"J. E. S.," Greensboro, N. C. Superphosphate of lime and salt, along with barn-yard manure, are the proper fertilizers for mangels. We doubt if a good crop can be grown without the barn-yard manure, and with it alone good crops are raised. But with a moderate quantity, say 6 or 8 loads per acre, plowed in in the drills, and 200 lbs. of superphosphate, with 300 lbs. of salt per acre, scattered along the rows as soon as the plants appear, a profitable crop ought to be grown.

Sundry Farming Matters.

Breeding Sows.—"O. O. F." If it is desired to breed from a sow twice in a year, she should be turned out the third day after pigging. But it is not every sow that will breed so early, and young sows are especially averse to it.....**Poke for Breachy Animals.**—"S. J. B.," Orange Co. The length of the poke, of whatever kind it may be, must be proportioned to the size and kind of the animal that is to wear it. If there is any danger of chafing the skin, that must be provided for in padding or shaping the poke.... **Compost for Corn.**—"G. M. P.," Franklin, Tenn. There is no danger of corn heating, when planted in drills with well rotted compost. The compost will not decompose any further, and hence can not heat. ..**"No Milk in the Bag."**—"A. G.," Passaic Co., N. J. One can not reasonably look for milk in a cow's udder two months before she comes in. There may be a thick, watery fluid or serum in the udder, which is nothing to be alarmed at.....**Corn Drill for Planting two Rows.**—"M. S.," Muscoda, Wis. Machines for planting two rows of corn at once, are only used in the West. The Vandiver corn planter, made by the Vandiver Co., Quincy, Ill., is extensively used. ..**Soil for Mangels.**—"Subscriber," Hudson, N. Y. A good sandy loam is excellent for mangels. Superphosphate of lime, and very fine ground bone-dust, (flour of bone), if pure, are good fertilizers for this crop.....**Mowers that will Cut Lodged Grass.**—"M.," West Middlesex, Pa. The machine that most successfully cut the rolled grass at the Centennial trials, was a new one, of which we do not remember the name. If the owners do not wish to let the public know the merits of their machine, we can not help it. ...**Brick Making.**—"G. W. L.," Dallas Co., Iowa. The process of making bricks by hand, was described and illustrated in the *American Agriculturist* for Febuary and April, 1872. ...**Cheese and Butter Factories.**—"W. W. F.," Clark Co., Ind. Descriptions of some butter and cheese factories, with several illustrations, were given in the *American Agriculturist* for April, 1874, which may be had. ....**Broom-making Machinery.**—"D. B.," Shreve, Ohio. The machinery is described in a small book, entitled "Broom-Corn and Brooms," which can be procured of the Orange Judd Company for 50 cents.

Catalogues Received.

NURSERYMEN.

C. H. Banta, Riverdale, Bergen Co., N. J. General assortment of fruit and ornamental trees.

D. C. Benton, Quincy, Ill., has greenhouse and bedding plants in addition to nursery stock.

Bronson, Hopkins & Co., Geneva, N. Y., send a wholesale price-list of their extensive stock.

Seth A. Bushnell, Oberlin, O., has, besides the usual varieties, a number of specialties in apples, etc.

B. P. Davenport, Saline, Mich.—Small fruits and vegetable plants.

Downer & Brother, Fairview, Ky.—A wholesale list of the nursery long favorably known as their father's.

Thos. Jackson, Portland, Me.—Fruits and forest trees, with nursery grown and wild evergreens.

Fred. W. Kelsey, Rochester, N. Y.—Large variety of fruit and ornamental trees. Select lists of the best trees of various classes.

J. W. Manning, Reading, Mass., sends an essay on tree planting, with his wholesale list of fruit and ornamental trees.

Polk & Hyatt, Odessa, Del.—General list, with a very great variety of peaches.

C. S. Pratt, North Reading, Mass.—Full list of small fruits.

I. E. Remsburg, Atchinson, Kas., puts his catalogue in the form of the "Rockland Fruit Farm Annual," in which the Col. Cheney Strawberry, occupies the largest space.

D. B. Wier, Lacon, Ill.—Fruit trees, with specialties of hardy sorts; ornamental trees and shrubs.

SEEDSMEN.

D. C. Brainard, Mt. Lebanon, N. Y.—A handsomely illustrated catalogue of flower and Shaker's vegetable seeds; also a useful Almanac and Rural Register.

John Lewis Childs, Queens, N. Y.—Flower and Vegetable Seeds, Bulbs, and Plants.

Samuel N. Cox, St. Joseph, Mo.—Remarkably neat and full catalogue of seeds and greenhouse plants.

Crosman Brothers, Rochester, N. Y.—A full illustrated catalogue, with novelties in vegetables and flowers.

Hawkins & Cornish, Goshen, Orange Co., N. Y.—Garden and field seeds, with various novelties, especially in potatoes.

C. F. Lane, Koskonong, Wis.—A very instructive and well classified catalogue, including apiary requisites.

Aaron Low, Essex, Mass.—Garden and flower seeds, including several local specialties; also implements.

Price & Knickerbocker, Albany, N. Y.—Seeds and horticultural implements; fully illustrated.

W. H. Spooner, Boston, Mass., has removed to 98 Fremont St., near Horticultural Hall.

William Rennie, Toronto, Canada.—Grass, grain, and other field seeds, including field peas.

H. W. Williams & Son, Batavia, Ill.—Potato catalogue, with a full treatise on cultivation.

FLORISTS.

D. C. Benton, Quincy, Ill.—A general stock, including novelties.

Dingee Conard Co., West Grove Pa.—A New Guide to Rose Culture, including a long catalogue of roses, of which the firm make a specialty.

J. K. & S. J. Galloway, Montgomery, O.—Greenhouse and bedding plants at wonderfully low rates.

M. Michel, Bryan, Brazos Co., Tex.—Bedding and vegetable plants.

John Saul, Washington, D. C., issues a special catalogue of roses, including the novelties of 1877, and the older sorts.

H. W. Williams, Batavia, Ill.—A very full descriptive list, with novelties.

MOWERS, REAPERS, AND OTHER IMPLEMENTS.

Adriance Platt & Co., Poughkeepsie, N. Y., and 165 Greenwich St., city of New York, issue a beautifully executed illustrated catalogue of their Buckeye Mowers and Reapers. This is the twentieth annual circular, and, as since the first, this justly celebrated implement has been improving in every possible way to keep pace with every modern requirement, the new Model Buckeyes may be considered to have attained "the highest standard of excellence"

H. B. Griffing & Co., 60 Cortland St., New York city.—Catalogue of agricultural implements, seeds, fertilizers, and bone-meal, and beef scraps for feeding purposes.

Gardner B. Weeks, Syracuse, N. Y.—Descriptive circular of Chapman's Railway Hay Pitching and Stacking Outfit. Also catalogue of dairy supplies and apparatus.

Fisher & Norris, Trenton, N. J.—Price-list of anvils and double-parallel leg screw vise.

John B. Varney, South Berwick, Me.—Circular and price-list of Varney's Standard Plows.

Thomas Peppler, Hightstown, N. J.—The Climax Plow and Cultivator Combined.

P. S. Wiseman, Toledo, Ohio.—Illustrated circular of Wiseman's Register for measuring grain from the spout of thrashing machines.

FERTILIZERS AND MISCELLANEOUS.

A. E. Cooper. Cooper's Plains, Steuben Co., N. Y.—The "Cooper Chair" in remarkable variety of styles.

Rafferty & Williams, manufacturers of bone and blood fertilizers.

The Mapes Formula & Peruvian Guano Co., No. 158 Front St., New York, send a "Descriptive Price Current," which gives the names, guaranteed composition, and prices of an astonishing number of articles, which are or may be used as fertilizers.

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IT HAS THE LARGEST SALE OF ANY LAWN MOWER IN THE WORLD.

It has been adopted, and can be seen in practical operation on **Central Park** and all the other **City Parks, New York; Government Grounds** and **City Parks, Washington; Boston Common, Boston; Prospect Park, Brooklyn;** and on almost every prominent Park throughout the **United States and Canada.**

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Four sizes for hand-power; four sizes for horse-power.

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CITY AND COUNTRY TRADE
SUPPLIED WITH THE

Celebrated Excelsior Lawn Mower.

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EIGHT SIZES FOR HAND USE.

Weighing from 28 to 55 lbs.

THREE SIZES FOR HORSE POWER.

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WM. E. BARRETT & Co., 44 Canal St., Providence, R. Island.
J. M. CHILDS & Co., 12 & 14 Fayette St., Utica, N. Y.
STEELE & AVERY, 44 & 46 State St., Rochester, N. Y.
EVERSON, FRISSELLE & Co., 10 So. Salina St., Syracuse, N.Y.
T. HAWLEY & Co., 93 Water St., Bridgeport, Conn.

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HAY LOADER.

A perfect machine for rapidly pitching hay, barley, and all loose grain on the wagon, in the field. Increased success in the harvest of 1876. Received the highest and only award for Hay Loader, with Diploma of Merit at Centennial Exposition, based on field trial. Thousands in successful operation. *Send for circulars early to the manufacturers,* STRATTON & CULLUM, Meadville, Pa. ☞ KINGMAN & CO., Peoria, Ill., Gen'l Agents for Illinois, Missouri, and Kansas.

CHICAGO SCRAPER AND DITCHER.

Guaranteed to do double the work of common scrapers, and do it easier for man and team. But one man required to work it. No hand-work to finish up a road. Good roads can be made with them at 25 cents per rod. Broad open ditches at 10 cents. Townships and counties can take them on trial. Price $13, on cars at factory. Send for Manual of Road Making and Ditching, free. Address

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CRANBERRY PLANTS in variety, by mail.

Send for circular giving mode of culture, soil, &c.

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Small Fruit Plants a Specialty. Good stock, low prices. See page 114 (March No.) JOHN S. COLLINS.

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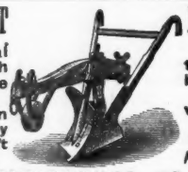

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All Sizes.

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THE ONLY PERFECT SWIVEL PLOW.

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Gents:—The Side-Hill Plow, No. 160, you sent me last summer, has been used thoroughly on stony, turf, level, and side-hill, with equal success. It proves to be strong, well made, easily worked, good for one yoke, and does excellent work. It is a plow that will recommend itself. We have plowed 12 or more acres, and had many visitors who were highly pleased with its operations.

Yours truly, CHESTER SAGE.

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SPRING STEEL TOOTH HORSE RAKES.

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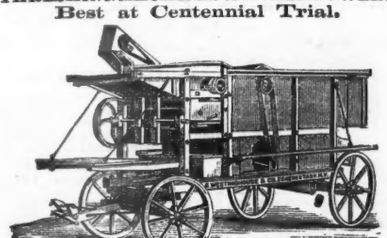

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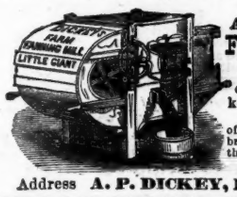

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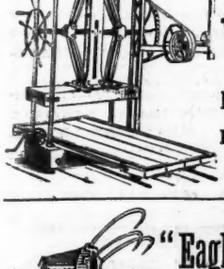

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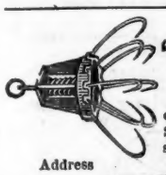

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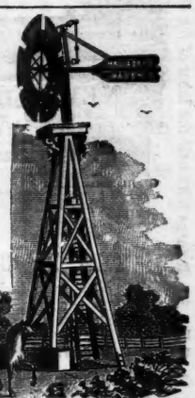

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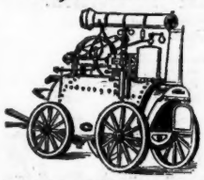

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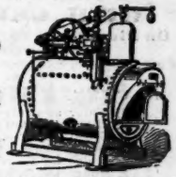

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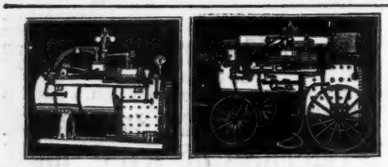

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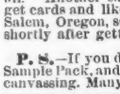

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